

APPLICATIONS SOFTWARE OPPORTUNITIES

WESTERN EUROPE

INPUT



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Researched by  
INPUT, LTD.  
41 Dover Street  
London W1X 3RB  
England

Published by  
INPUT  
1280 Villa Street  
Mountain View, CA 94041-1194  
U.S.A.

**Software and Services Programme—Europe  
(SSPE)**

***Applications Software Opportunities—  
Western Europe***

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# Abstract

This report examines the trends, opportunities, issues and success factors that are affecting vendors of applications software products.

Developments in the different European country markets and the major application areas (cross-industry and vertical markets) are reviewed, together with an analysis of the key issues impacting the development of the user environment.

Market size and growth figures are included, with breakdowns by country, major industry sectors and cross-industry applications.

The report also makes reference to the market for custom-developed software, and discusses the increasing use of the kernel approach to the development of solutions.

This report contains 154 pages, including 69 exhibits.



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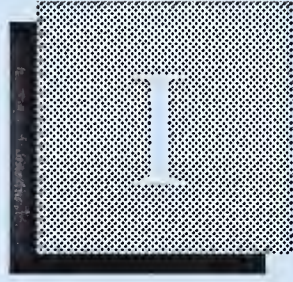
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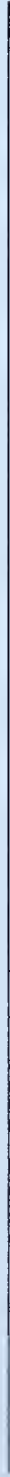
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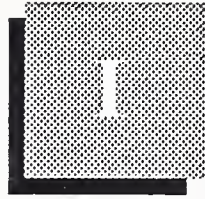


# Introduction









# Introduction

## A

### Scope and Objectives

The increasing trend towards standard applications software products is changing the way vendors are approaching and should approach the market.

The growing internationalisation of the Western European market, the benefits of partnerships, and the use of CASE tools in customising software products are among the developments that all companies in the industry need to keep abreast of in order to take advantage of the available opportunities.

INPUT's particular objectives in conducting this research programme and preparing this report have been to:

- Establish an overall view of the market for applications software products in an attempt to allow vendors to assess potential market opportunities.
- Analyse the key trends and issues that are likely to affect the development of the market.

This report covers all of Western Europe. The largest country markets—France, West Germany, the UK and Italy—are dealt with in most detail. The study also covers Benelux, Scandinavia, Spain, Switzerland and Ireland.

Only software for business applications comes within the scope of this study. This includes packages working on PCs, minicomputers and mainframes. Specifically excluded is software for the home computer market.

Although the study specifically examines standard applications software packages, it is evident that most software vendors must be involved in customisation to a greater or lesser extent. Hence this aspect is dealt with wherever appropriate.

The market size and forecast figures in this report refer specifically to standard applications software packages, unless otherwise stated. Included as user expenditures are lease and purchase expenditures, as well as fees for work performed by the vendor to implement and maintain the package. Fees for work performed by organisations other than the package vendor are counted as professional services.

INPUT has previously published a number of reports on related subjects, both in the U.S. and Europe. These are listed in Appendix D.

Enquiries and comments are invited by INPUT regarding this report or related topics of interest to readers.

INPUT expresses its thanks to all those individuals and companies that participated in the research.

## B

### Methodology

Field research for this report was obtained from an interview programme conducted during the period of January through April 1988; the programme consisted of:

- User interviews
  - Structured interviews with 203 senior personnel in both the data processing and end-user departments (ratio 50:50) of a wide cross-section of companies.
  - The interviews addressed levels of usage of applications software, future plans, problems encountered, and general strategy regarding the purchase of applications software products.
  - The questionnaire used for these interviews is included as Appendix C.
- Vendor interviews
  - In-depth interviews (mainly face-to-face discussions) were conducted with 27 senior personnel from independent software vendors and hardware manufacturers.



- Other studies
  - INPUT's continuing research programmes on the information services markets have been used where appropriate to further understanding of the issues and markets discussed.
- Other public-domain sources
  - Company press releases, press articles and reports have been used where appropriate to obtain background data on market developments.
- An analysis of the research sample is included as Appendix B.

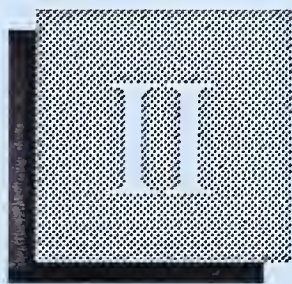
## C

### Report Structure

This report is organised as follows:

- Chapter II is an Executive Overview. A review of the cardinal points of the entire report is provided in order to facilitate clients' internal briefing sessions.
- Chapter III provides market sizing and forecasts for the 1988-1993 timeframe.
- Chapter IV covers the European applications software market in terms of the vendor environment.
- Chapter V contains a review of the major country markets covered in this report
- Chapter VI provides a detailed analysis of the major vertical- and cross-industry application areas.
- Chapter VII analyses user attitudes and needs in relation to applications software.
- Chapter VIII discusses current trends and issues.



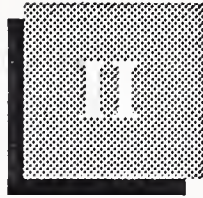


# Executive Overview









## Executive Overview

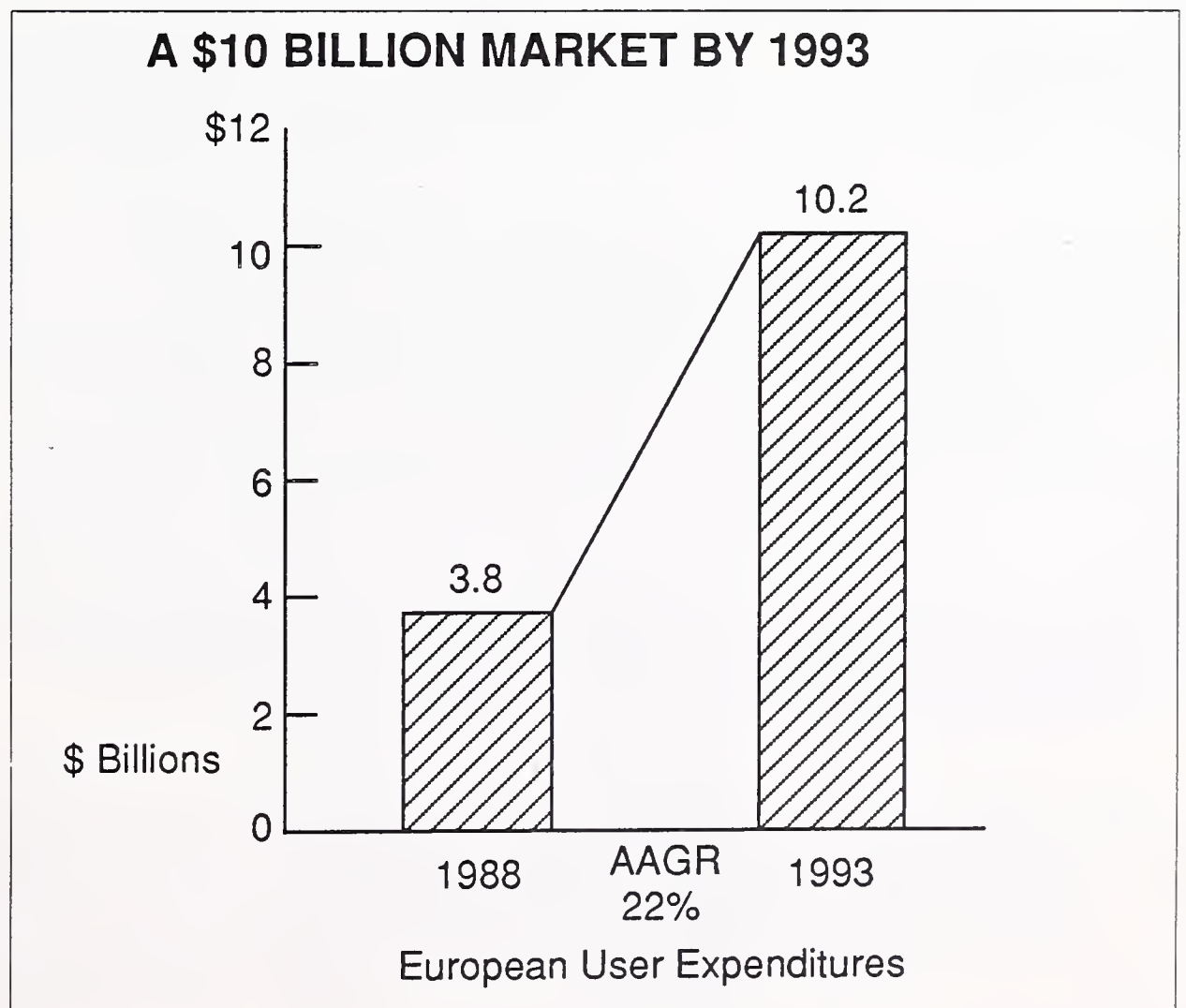
### A

#### A \$10 Billion Market by 1993

INPUT estimates that the market for applications software products in Western Europe will reach nearly \$4 billion in 1988.

As illustrated in Exhibit II-1, this market is expected to grow at an average annual growth rate (AAGR) of around 22%, to just exceed \$10 billion by 1993.

EXHIBIT II-1



Among the factors driving this growth are:

- The shortage of skilled programmers, making a case for abandoning in-house development.
- Increasing numbers of installed computer systems, particularly mini-computers, workstations and PCs.
- Cost and timescale pressures on users, making standard packages a more practical alternative than custom solutions.
- The availability of more and better packages.
- The movement towards standards, potentially providing vendors with a more stable environment within which to operate

Threats to the growth of this market include:

- Price reductions due to increased competition
- A continuing preference by European users for individual solutions
- Different requirements in different European countries
- A threat at the upper end of the market from flexible 4GL development tools, which enable users to develop their own applications

## B

### Competitive Environment

INPUT estimates that the Western European market for applications software products can broadly be segmented as follows:

- |   |     |
|---|-----|
| • European-owned independent vendors          | 44% |
| • U.S.-owned independent vendors              | 32% |
| • Hardware Manufacturers                      | 22% |
| • Others (e.g., Australian, Far East vendors) | 2%  |

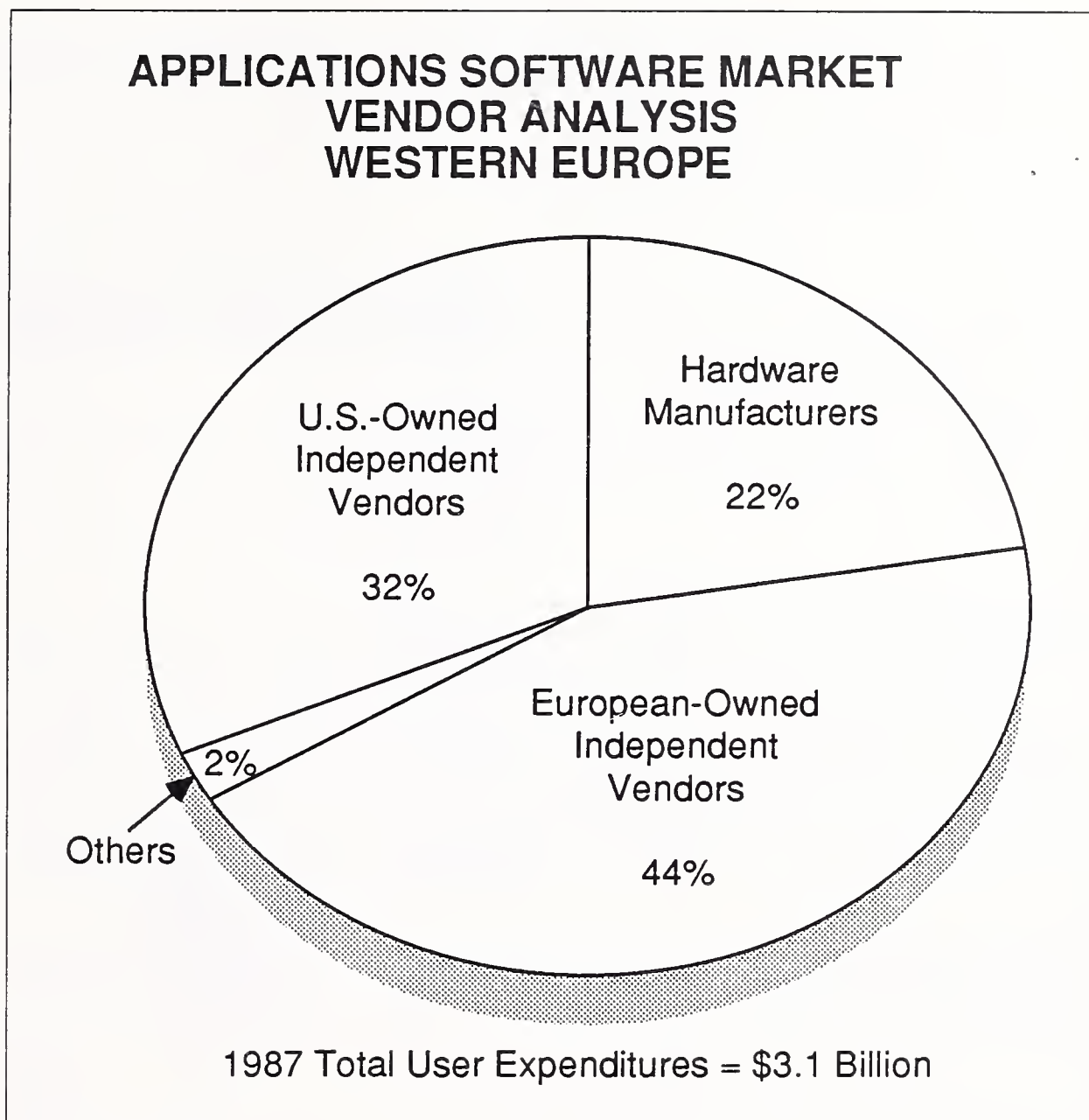
This is illustrated graphically in Exhibit II-2.

The European-owned independent vendors are the most numerous. They are mainly small companies that confine themselves to their home country markets. By far the biggest company in this category is the West German company SAP.

The leading U.S.-owned independent vendors (e.g., Lotus, Microsoft, MSA) have significant revenues in most Western European countries. Many of these companies now look to Europe for more and more of their business, as the growth rate of the market in Europe is somewhat higher than in the U.S. Most smaller U.S.-owned vendors do not have subsidiaries in Europe, but operate through European representatives.



EXHIBIT II-2



The main hardware manufacturers in the Western European marketplace are IBM, Digital, Siemens and Olivetti. All of these companies are concentrating their efforts more on applications software products than they have in the past. This is being done partly through partnership agreements with independent vendors, and in some cases (notably Olivetti) through the acquisition of software companies.

## C

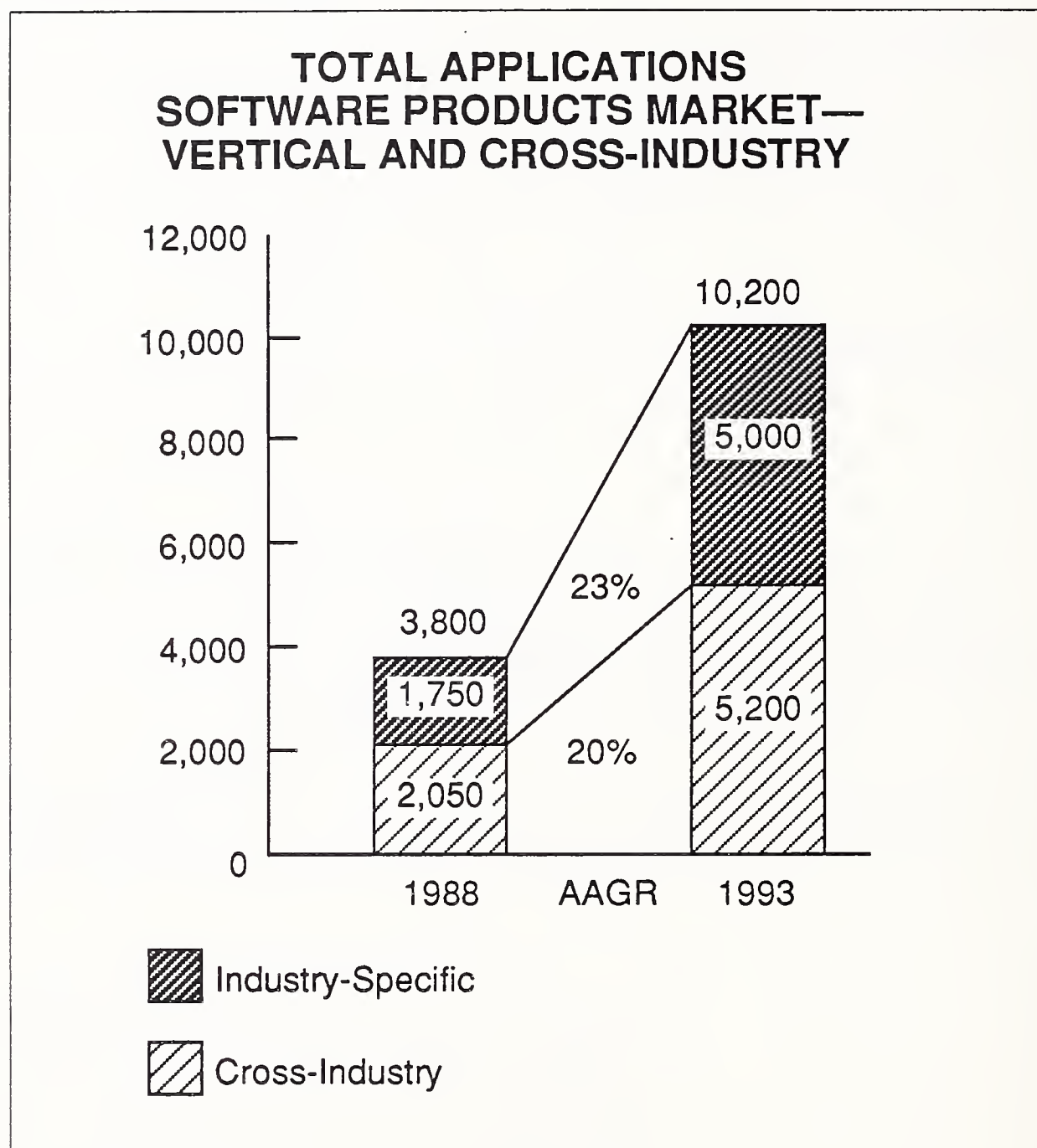
### Industry-Specific Sector to Show Healthy Five-Year Growth

INPUT estimates that the market for industry-specific (vertical) applications software products will account for around 45% of the total market in 1988.

As shown in Exhibit II-3, the industry-specific sector is expected to grow at an average annual rate of 23%, while the cross-industry sector is predicted to experience a slower growth rate of about 20% over the period 1988 to 1993.

Thus INPUT forecasts that industry-specific applications software products will account for a larger share (almost 50%) of the total market by 1993.

EXHIBIT II-3



## D

### Major Industry-Specific Markets

The three largest industry-specific markets are:

- Manufacturing
- Banking and Finance
- Distribution

These three industries are estimated to account for over half of the total industry-specific applications software products market.

The manufacturing sector will continue to be very important as users strive to improve their performance through automation. Vendors are now advocating integrated systems that embrace every stage of the manufacturing life cycle as well as link manufacturing applications to nonmanufacturing ones such as distribution, accounting, etc.

Most of the demand for applications software products in the manufacturing sector is for discrete manufacturing applications (with process manufacturing accounting for a smaller share). As shown in Exhibit II-4, the discrete manufacturing sector is expected to grow from just under \$400 million in 1988 to over \$1,100 million in 1993, corresponding to an average annual growth rate of 23%.

Applications software for the banking and finance sector is being increasingly supplied by third-party software companies, reducing the proportion developed in-house. Banks are being forced to look at standard solutions where possible in order to reduce costs. However, the demand for custom software will also remain strong as banks and other financial institutions strive for competitive advantage by providing services that are not offered by their competitors.

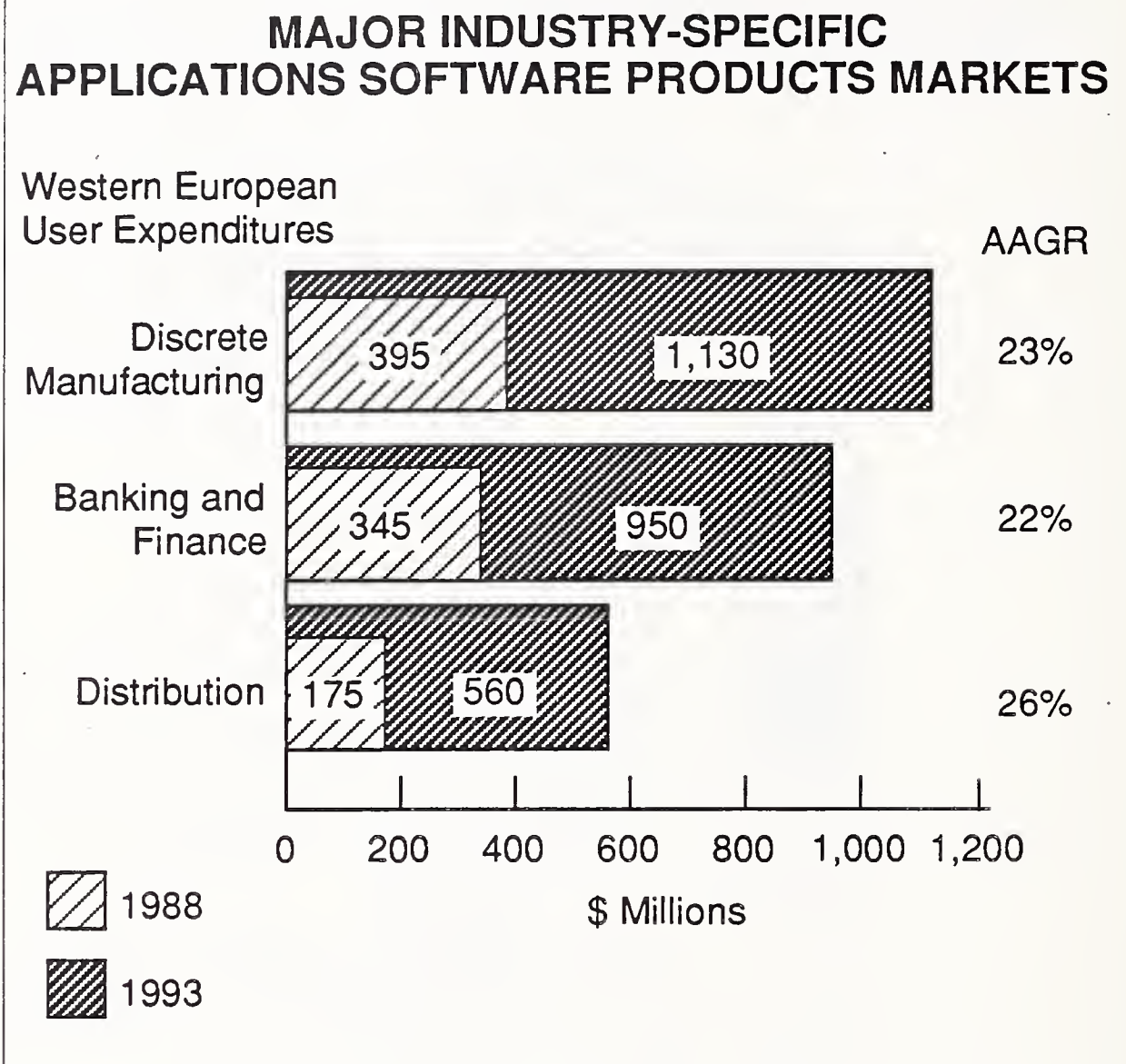
As shown in Exhibit II-4, INPUT predicts an average annual growth rate of 22% for the period 1988 to 1993, resulting in an increase in the market size from just under \$350 million to about \$950 million.

The market for industry-specific applications software products in the distribution sector is expected to show high growth over the next five years. The retail trade in particular is expected to increase investment considerably in order to improve service and cut costs.

As illustrated in Exhibit II-4, INPUT predicts that the market for industry-specific applications software products in the distribution sector (wholesale and retail) will increase at an average annual growth rate of 26%—from about \$175 million in 1988 to \$560 million in 1993.



EXHIBIT II-4

**E****Cross-Industry Applications**

The major cross-industry application areas are:

- Accounting
- Planning and Analysis
- Human Resources

These three areas are estimated to account for around 70% of the cross-industry applications software products market in 1988.

However, these applications are all quite well established, and hence relatively modest growth rates can be expected; see Exhibit II-5. In 1993, INPUT estimates that these applications will make up around 60% of the cross-industry market.

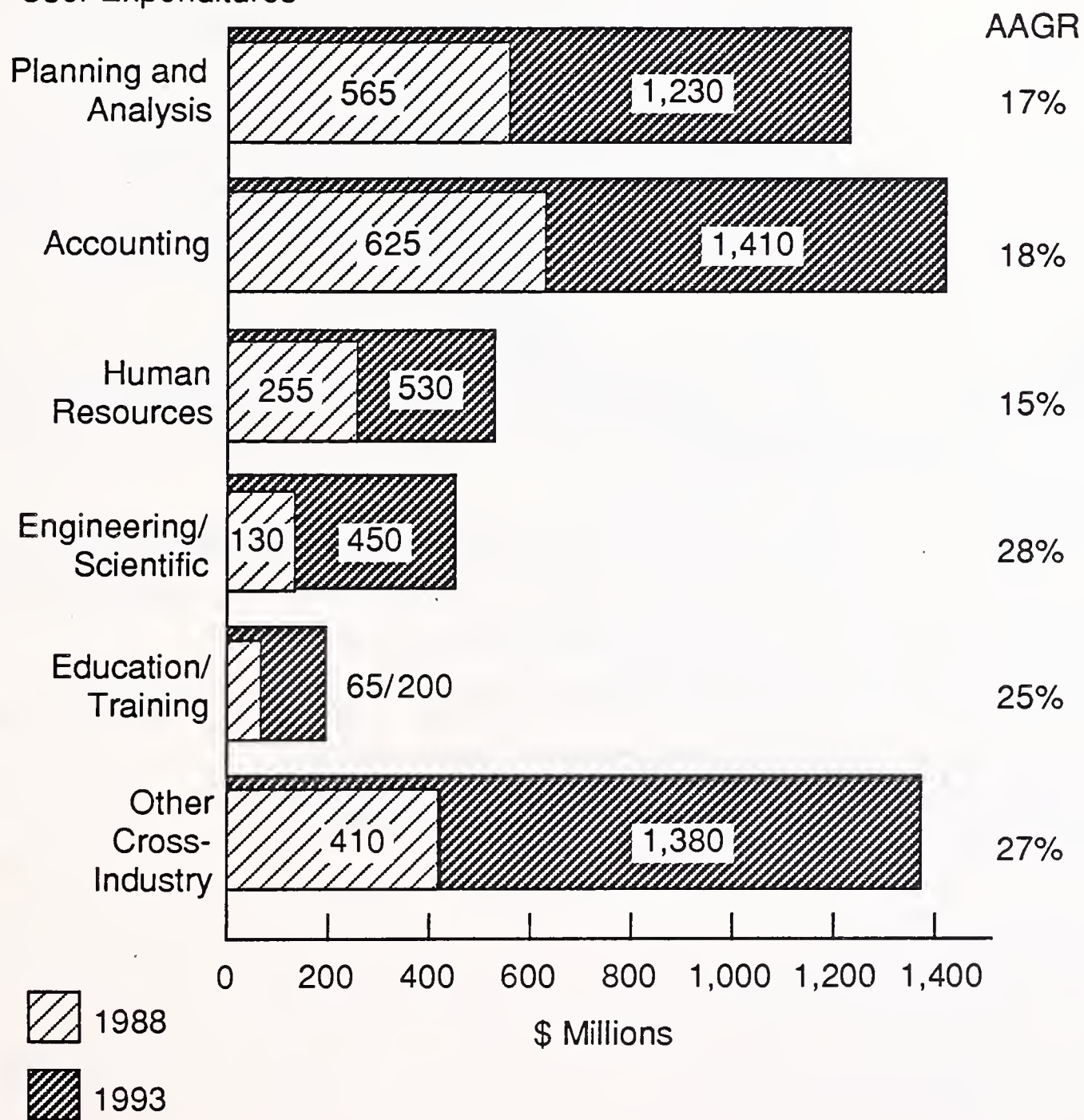
Stronger growth is expected in the other application areas, particularly in the engineering and scientific market.

The “other cross-industry” sector comprises mainly word processing, the market for which is quite mature. The overall growth rate is increased substantially by the fast-moving graphics and desktop publishing application areas.

EXHIBIT II-5

### CROSS-INDUSTRY APPLICATIONS SOFTWARE PRODUCTS MARKETS

Western European  
User Expenditures



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**F****Country Market  
Breakdown**

Exhibit II-6 gives a breakdown of the Western European applications software products market by country.

The three major markets, West Germany, France and the U.K., together account for over 60% of the total market. The growth rates in all of these countries are expected to be in the region of 20% for the period 1988 to 1993.

The next-biggest market, Italy, is affected to a degree by the lack of copyright laws for software. INPUT, however, predicts an average annual growth rate of around 25%, reflecting the relative immaturity of the Italian market at present (compared to France and Germany for example), and thus the potential for growth that exists.

The Spanish market is expected to increase at the fastest rate—about 30% per annum—reflecting the rapid growth of hardware sales in the country. Spain at present lags far behind the other major European countries in terms of level of development and market size. It is, however, becoming increasingly attractive for software vendors.

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**G****Partnerships**

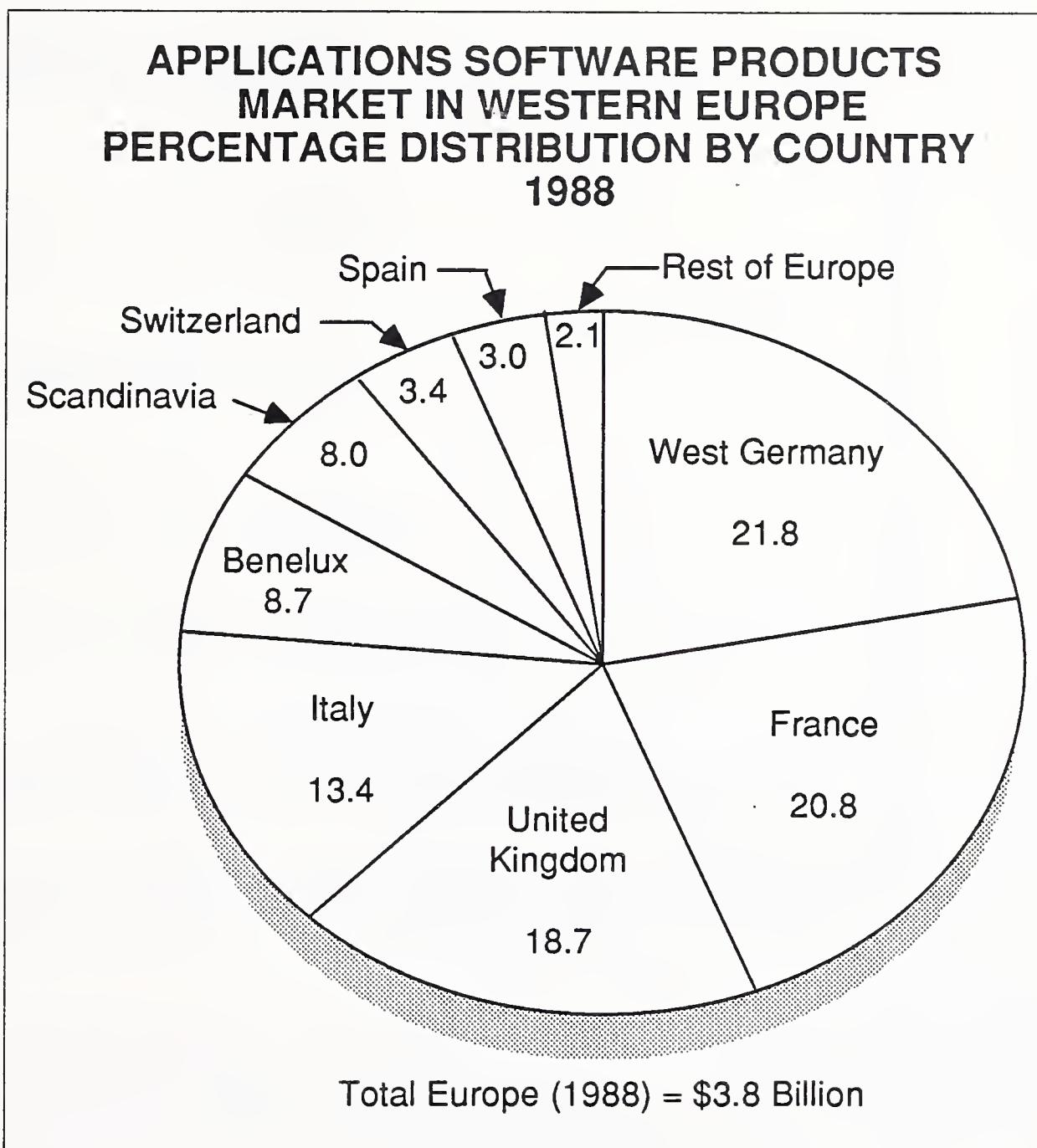
There is a growing recognition amongst applications software product vendors of the benefits to be gained from working in partnership with other companies.

These partnerships vary from informal arrangements—where vendors recommend each others' products to customers—to official joint marketing or product-development agreements.

One of the areas where partnerships can be most beneficial is in providing vendors with access to foreign markets.



EXHIBIT II-6



INPUT's research highlighted three major types of partnership arrangements that are being practiced in Europe. These are listed in Exhibit II-7.

Agreements involving two software houses can be particularly attractive for companies entering foreign markets. They can also be mutually beneficial where the product portfolios of the two companies complement one another.

Those vendors interviewed by INPUT saw significant advantage to be gained from cooperation between hardware manufacturers and independent applications software product vendors. The general consensus is that these two types of vendor do not often compete directly, but can leverage business for each other. Hardware manufacturers cannot normally supply all the software needed by their customers, and hence need the support of



## EXHIBIT II-7

**VENDOR PARTNERSHIPS**

- Software House Partnerships
- Hardware/Software Companies
- Vendor/Client Agreements

third-party vendors. Also, the independent software vendors need access to the distribution networks of the big hardware companies.

Partnerships involving a vendor and a client are less common. However, INPUT sees this as a potentially attractive approach to new-product development.

**H****User Problems and Priorities**

The main problems encountered by users with applications software products, and the main priorities they mentioned, are listed in Exhibit II-8.

About 30% of users reported poor features or performance, and 25% mentioned documentation as a major problem.

Dissatisfaction with documentation is largely due to too much technical detail. French and Spanish users also reported a lack of good documentation in their own languages.

Users rated ease of use as the most important criterion when evaluating applications software. Documentation was the second most important, with ongoing application support the third-highest priority.

## EXHIBIT II-8

**USER PROBLEMS AND PRIORITIES****Problems:**

- Poor Features/Performance
- Documentation

**Priorities:**

- Ease of Use
- Documentation
- Ongoing Application Support

**I****Product-Custom  
Convergence**

The boundary that separates standard and customised applications software is becoming increasingly blurred.

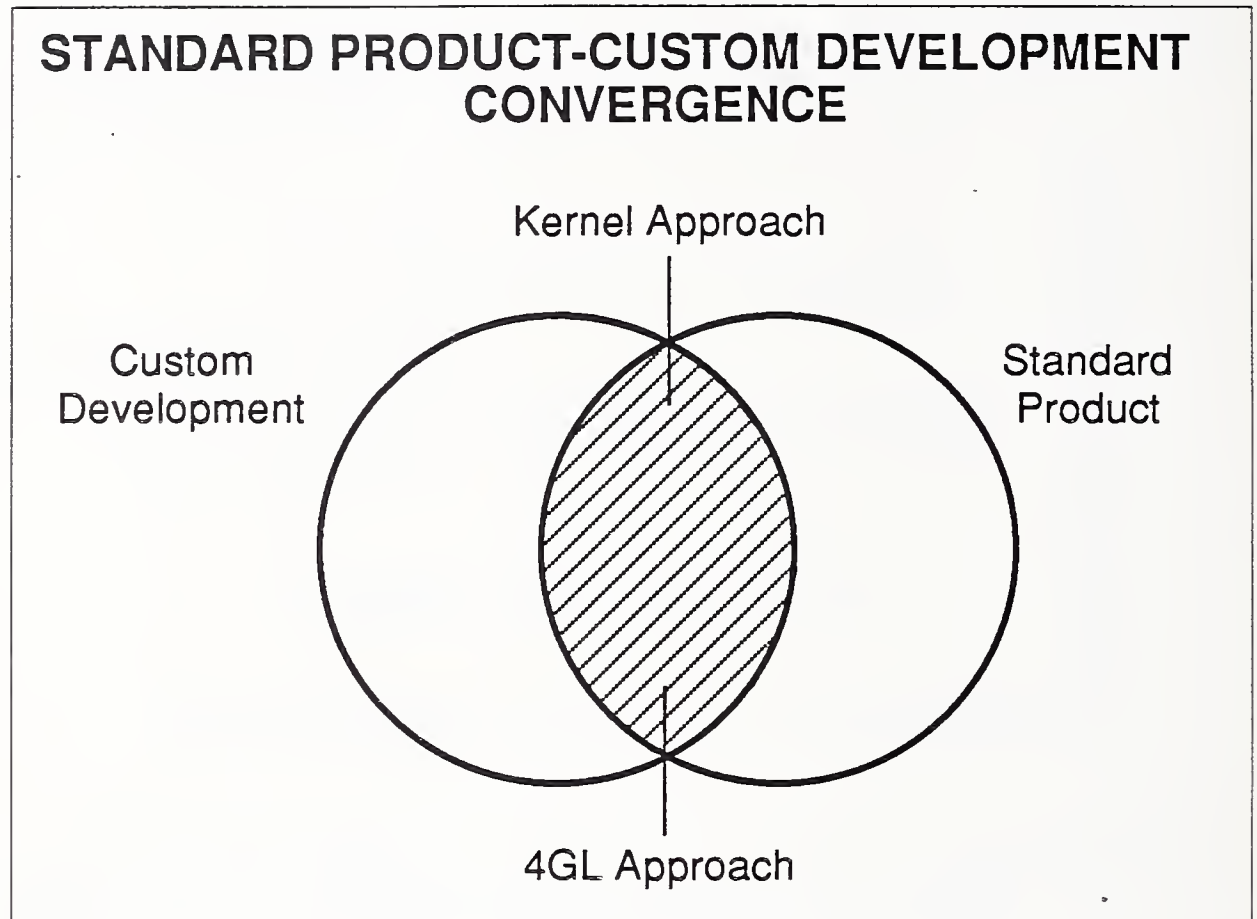
This blurring is being driven by two major developments:

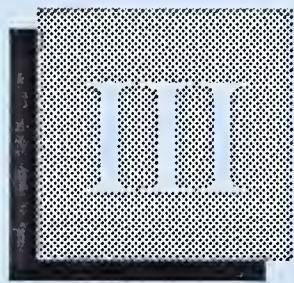
- Software product and professional services companies are building custom systems from “kernels” or reusable component programmes.
- Certain vendors (e.g., Cincom, Cullinet, Ashton-Tate) are using the package-plus-language approach, whereby fourth-generation languages are used to build applications around the central database.

The common aim of these approaches is to provide customer-specific solutions without the cost and manpower requirements of fully customised software.

The result, as illustrated graphically in Exhibit II-9, is that the activities of software package suppliers and professional services companies have started to move closer together. Vendors face the marketing challenge of deciding whether to position themselves as product or service providers.

EXHIBIT II-9



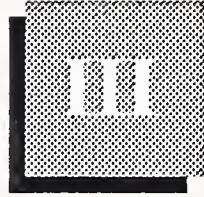


# Market Forecast









## Market Forecast

### A

#### Market Definition

INPUT's schematic representation of the total software products market is given in Exhibit III-1. This shows the constituents of both the systems and applications software subsectors.

Only applications software products come under the scope of this study. These products are defined as:

- Software that performs a specific function directly related to solving a business or organisational need. Applications software provides information directly for use by the end user.

Appendix A contains INPUT's detailed definitions.

### B

#### Forecast Definition

The market assessment and forecast growth that follow were developed from evaluation of current and projected activities within the market definition described above.

The forecast covers the period 1988 to 1993 (including 1987 actuals) and assesses end-user expenditures. Forecasts are made in local currencies and converted into U.S. dollars for aggregation and comparative purposes.

Owing to the volatility of international exchange rates, the U.S. dollar conversion rates used have been taken as the rate on July 1, 1988.

EXHIBIT III-1

## SOFTWARE PRODUCTS MARKET STRUCTURE

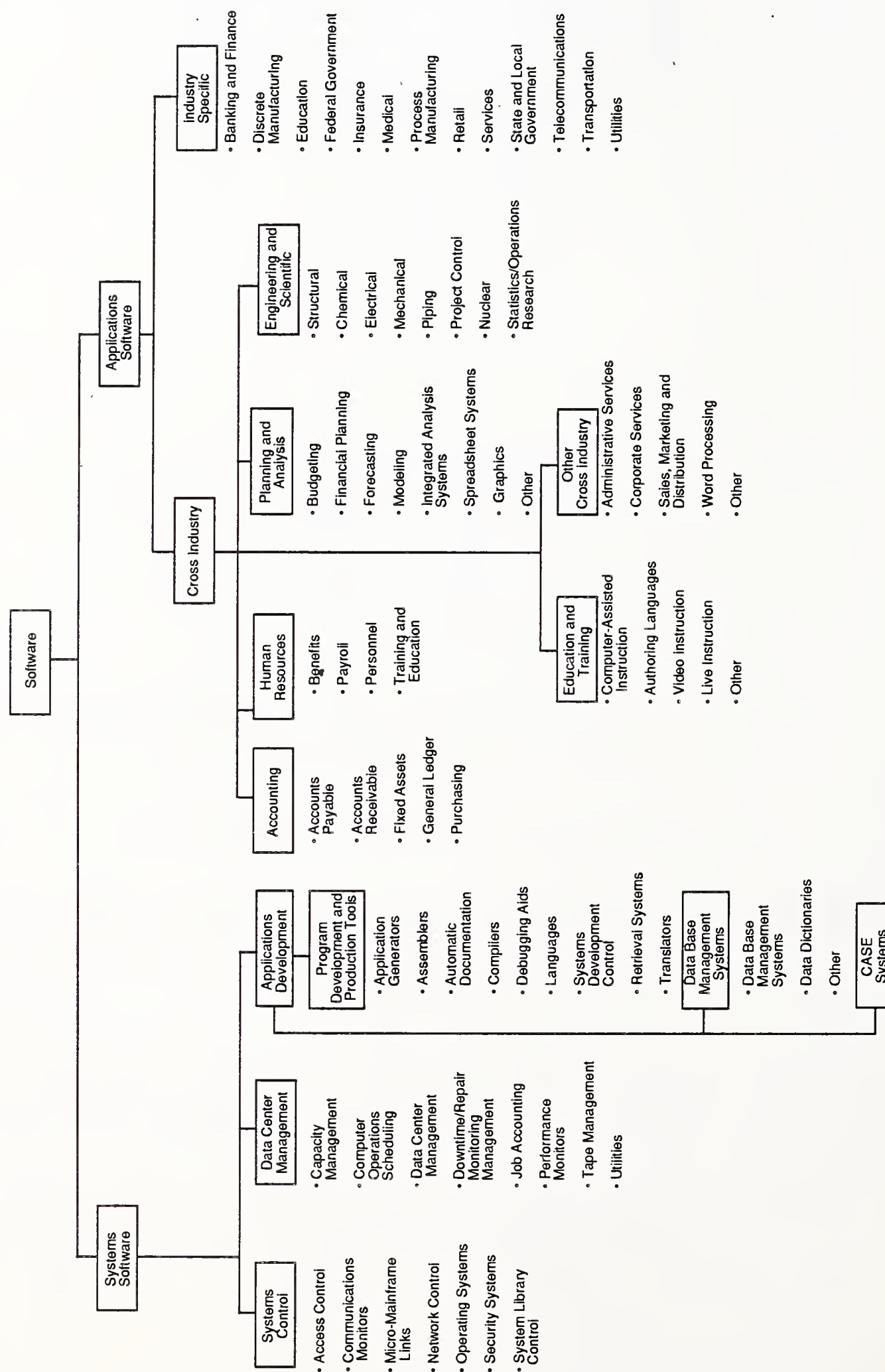


Exhibit III-2 sets out the average U.S. dollar exchange rates on July 1, 1988 for a range of Western European currencies.

## EXHIBIT III-2

### U.S. DOLLAR EXCHANGE RATES

COUNTRY	CURRENCY	DOLLAR EXCHANGE RATE
France	FF	6.13
West Germany	DM	1.82
United Kingdom	£	0.59
Italy	Lira	1,351.60
Netherlands	Dfl	2.05
Belgium	BF	38.10
Sweden	SK	6.29
Denmark	DK	6.91
Norway	NK	6.66
Finland	FM	4.34
Switzerland	SF	1.51
Austria	Sch	12.81
Ireland	IR£	0.68
Spain	Pta	121.40

Source: Swiss Bank (1 July 1988 rates).

In addition, the forecasts have been expressed in actual monetary terms. The latest inflation rates in Western European countries (i.e., percent change in consumer price index from June 1987 to June 1988) are as follows:

- France +2.6%
- West Germany +1.0%
- United Kingdom +4.6%
- Italy +4.9%



- Spain +4.3%
- Switzerland +2.1%
- Sweden +6.9%
- Netherlands +0.7%
- Belgium +1.0%

## C

## Overall Market

As shown in Exhibit III-3, INPUT forecasts that the Western European applications software products market will grow from a base of \$3.8 billion in 1988 at an average annual growth rate of 22%, reaching \$10.2 billion in 1993.

EXHIBIT III-3

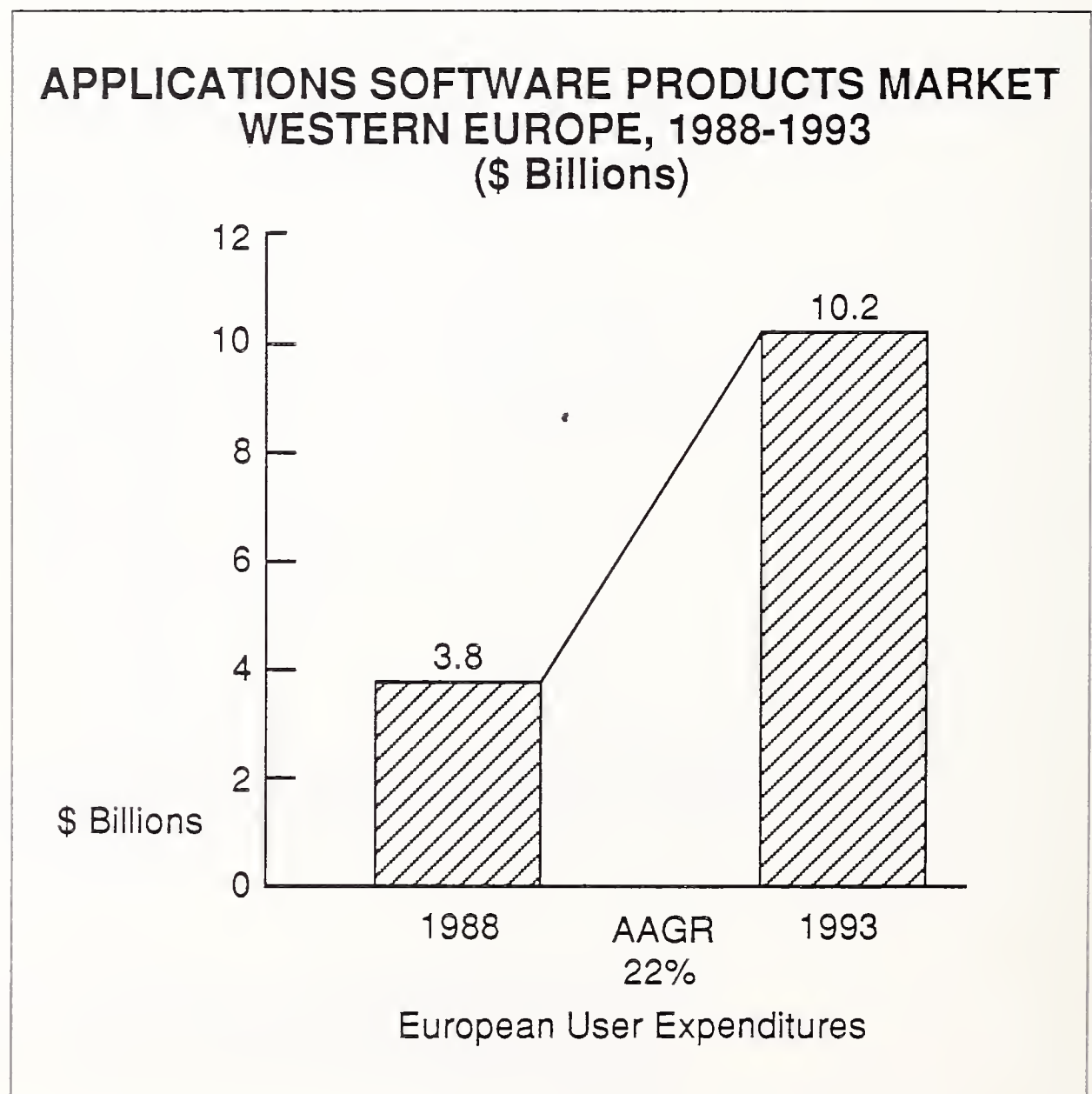
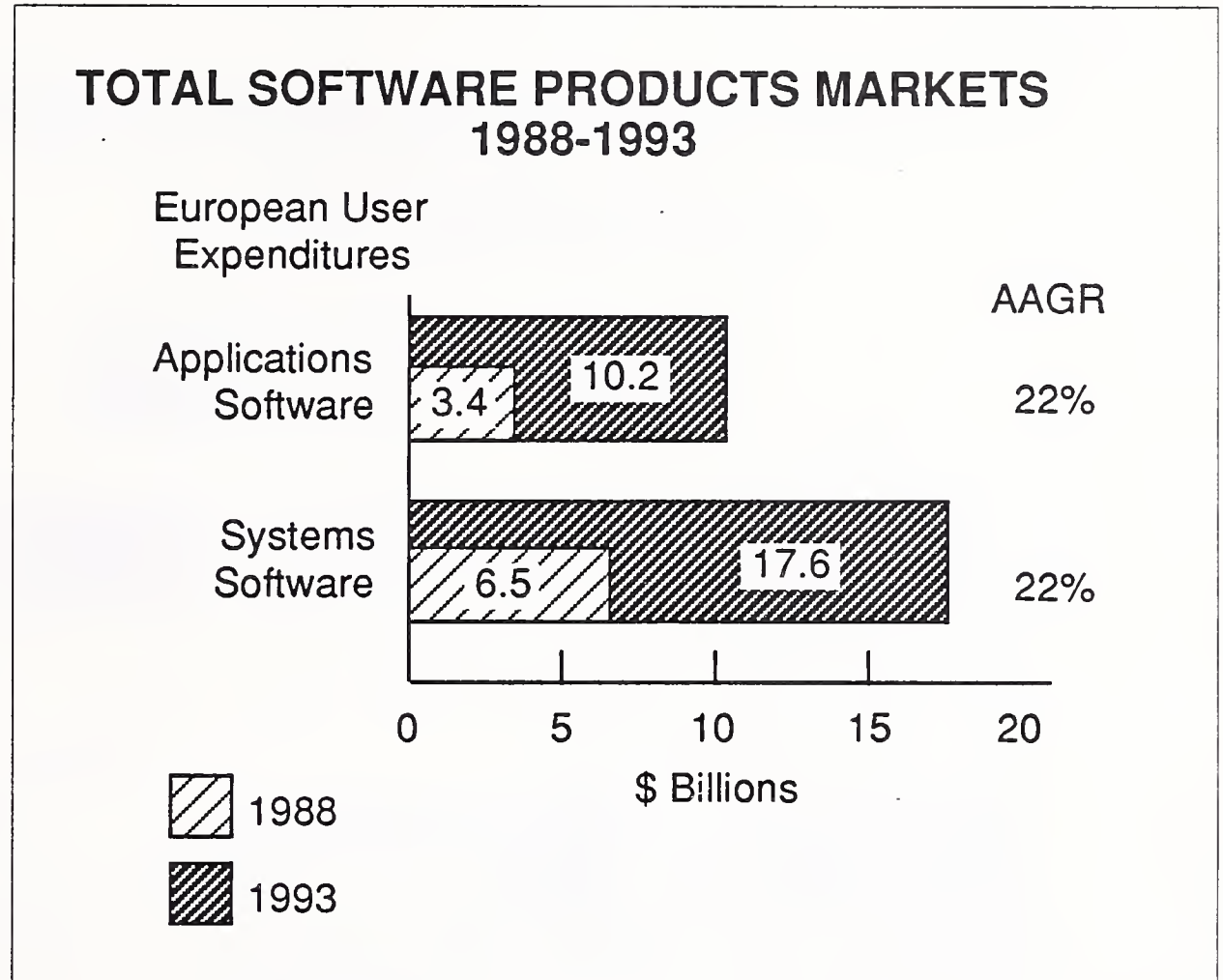


Exhibit III-4 shows the size of the applications software products market in Western Europe relative to the systems software products market.

## EXHIBIT III-4



The systems software sector is estimated to be about 70% bigger than the applications software sector in 1988. Both are expected to grow at a similar rate (about 22%) until 1993, at which time the applications market will be worth \$10.2 billion.

Detailed analysis of the information services industry as a whole is contained in INPUT's report entitled *The Western European Market for Information Services Analysis and Forecasts, 1987-1992*.

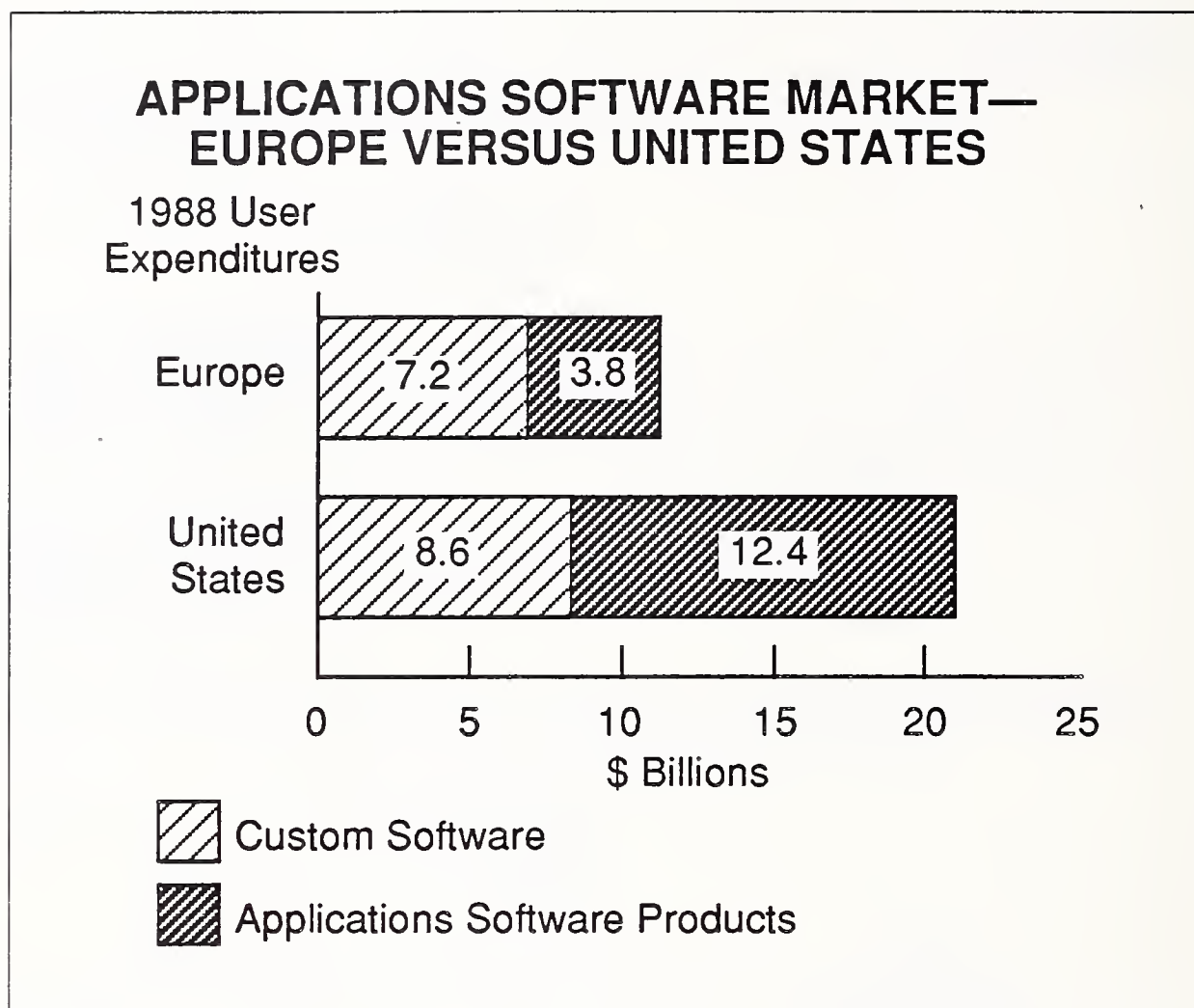
**D****Comparison with the United States**

The proportion of applications software that is custom developed is much higher in Europe than in the U.S.

There has generally been less acceptance of standard products by European users than by their American counterparts. The standard package approach is often less suitable in Europe because of the varied requirements in different countries.

Hence we see from Exhibit III-5 that the market for custom software in Europe is almost as big as the market in the U.S., whereas the European standard applications software market is far smaller.

EXHIBIT III-5



However, INPUT predicts that the difference in size between the U.S. and European applications software products markets will become smaller over the next five years. Exhibit III-3 showed that the average annual growth rate in Europe is expected to be about 22%. The growth rate for applications software products in the U.S. over the same period is expected to average about 17%.

## E

### Hardware Platform Analysis

Exhibit III-6 shows the breakdown of the applications software products market across the four hardware categories (mainframe, mini, workstation and PC) and their respective growth rates for the period 1988 to 1993.

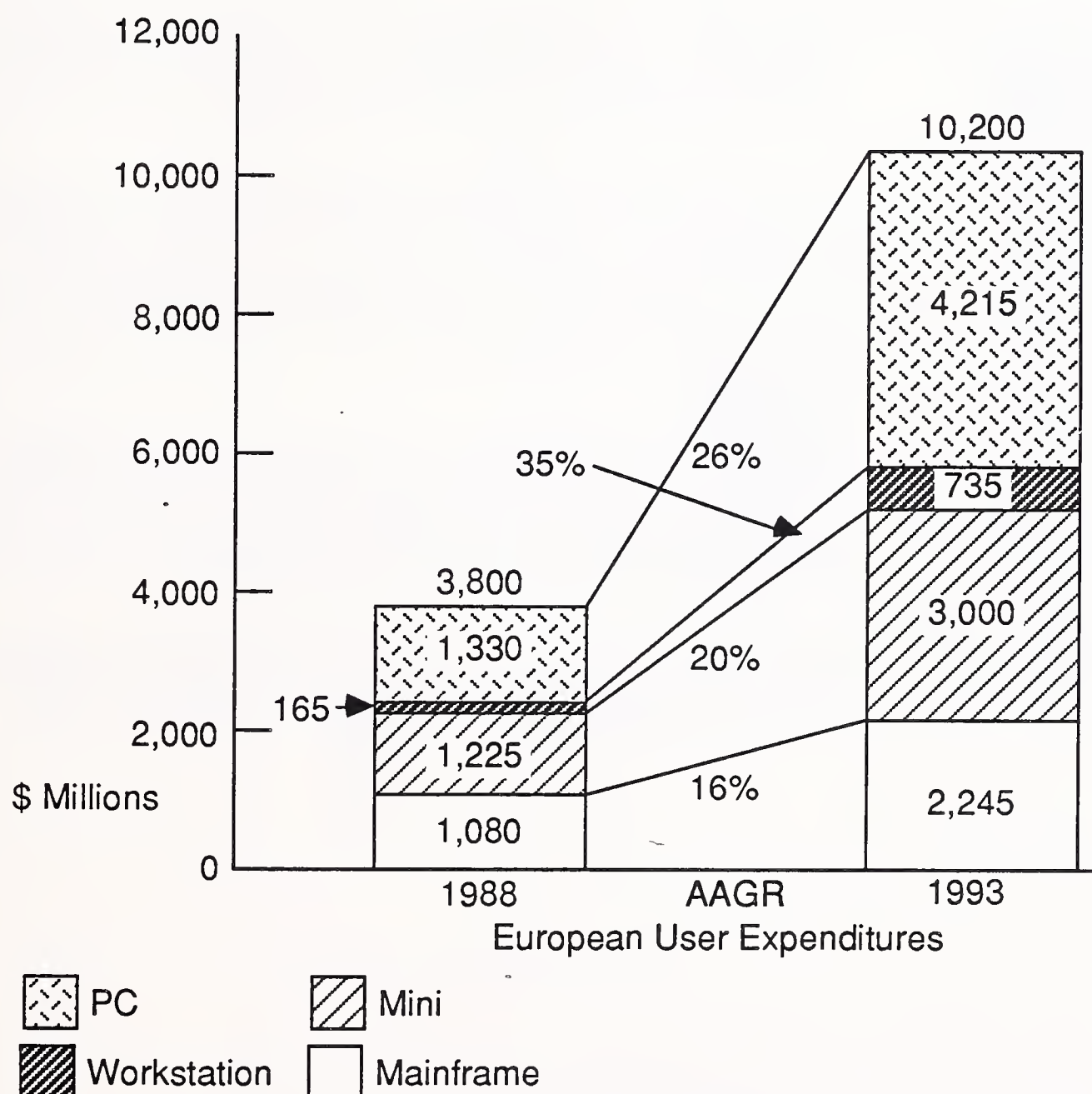
The mainframe sector is expected to have the lowest growth rate (16% per annum) over that period. This reflects the current and expected future slowdown in the growth of installed mainframe computers.

Mainframe computers are being replaced by powerful minicomputers and networked microcomputers in some areas. Consequently the demand for applications software for minicomputers will remain quite



EXHIBIT III-6

### APPLICATIONS SOFTWARE PRODUCTS MARKET, 1988-1993 BY HARDWARE PLATFORMS



strong. INPUT predicts an annual average growth rate of 20% for the five-year period.

The highest growth rate is expected to be for workstation applications software products. INPUT estimates that this market will increase by 35% annually, reflecting the anticipated rapid take-up by users of these machines.



The PC applications software market will continue to grow strongly. INPUT predicts an average annual growth rate of 26% for the period 1988 to 1993. This sector will account for by far the largest portion of the applications software products market by 1993.

## F

### Vertical and Cross-Industry Markets

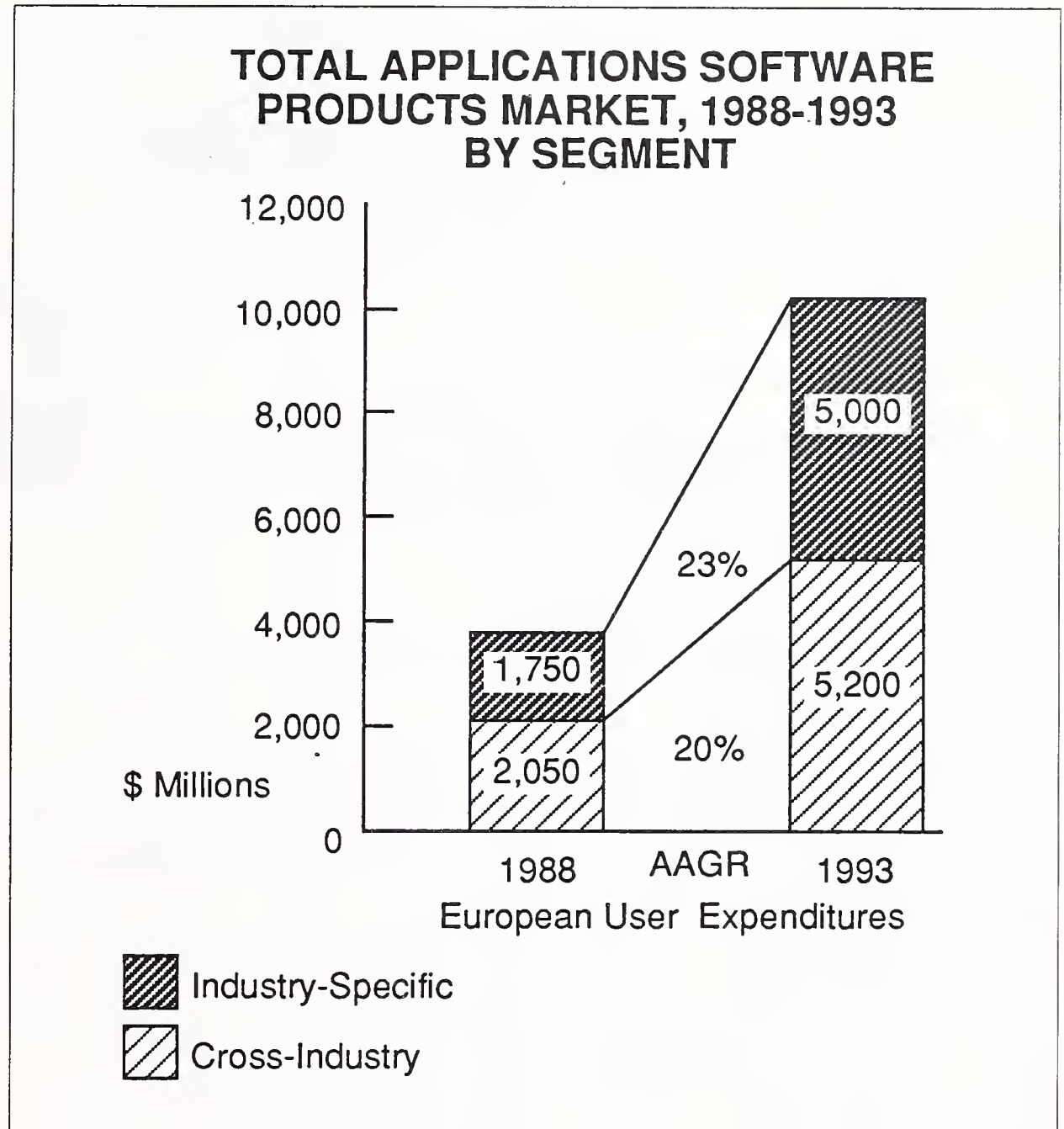
Exhibit III-1 provided a schematic representation of INPUT's classification of the applications software products market and shows the constituents of the applications software subsectors.

The market for cross-industry products is bigger in Europe than the industry-specific market. This reflects the greater acceptance of standard products for applications like accounting, spreadsheets etc., and a preference by many users for custom software for more specialised vertical applications.

As illustrated in Exhibit III-7, the market for industry-specific applications software products is expected to grow at around 23% per annum from 1988 to 1993, whereas the cross-industry market is predicted to grow at the slightly slower rate of around 20%.

Hence INPUT expects industry specific applications to make up a more significant proportion of the market (almost 50%) by 1993.

EXHIBIT III-7



### 1. Industry-Specific Software

Exhibit III-8 shows the size and growth of the industry-specific sectors. (The reader should note that these figures correspond to industry-specific software only. For example, expenditures by discrete manufacturing companies on accounting software are not included in this exhibit.)

The two most important industry-specific markets are discrete manufacturing, and banking and finance. These two sectors are expected to continue to grow strongly over the next five years.

The transportation industry is also expected to provide rapid growth. Companies involved in transportation now realise the necessity to automate in an industry that involves a significant amount of administrative procedures.

## EXHIBIT III-8

# **INDUSTRY-SPECIFIC APPLICATIONS SOFTWARE PRODUCTS MARKETS WESTERN EUROPE**

INDUSTRY SECTOR	MARKET FORECAST (\$ Millions)			
	1987	1988	1988-1993 AAGR (Percent)	1993
Manufacturing				
- Discrete	320	395	23	1,130
- Process	55	65	15	130
Transportation	75	95	27	320
Utilities	50	60	21	160
Distribution	140	175	26	560
Banking and Finance	280	345	22	950
Insurance	110	135	23	385
Medical	120	150	23	415
Education	50	60	20	150
Services	55	70	25	210
Government	70	85	22	235
Other Industry-Specific	85	110	26	355
Total	1,410	1,750	23	5,000

Banking and finance, manufacturing and distribution are discussed in more detail in Chapter VI of this report.

## 2. Cross-Industry Software

The size and growth rates of the cross-industry sectors are shown in Exhibit III-9.

EXHIBIT III-9

### CROSS-INDUSTRY APPLICATIONS SOFTWARE PRODUCTS MARKETS WESTERN EUROPE

CROSS-INDUSTRY	MARKET FORECAST (\$ Millions)			
	1987	1988	1988-1993 AAGR (Percent)	1993
Planning and Analysis	480	565	17	1,230
Accounting	520	625	18	1,410
Human Resources	220	255	15	530
Engineering/ Scientific	100	130	28	450
Education/ Training	50	65	25	200
Other Cross-Industry	320	410	28	1,380
Total	1,690	2,050	20	5,200

The three largest sectors are planning and analysis, accounting and human resources. These are well-established applications for standard packages. The growth rates predicted for the period 1988 to 1993 are lower than the average for cross-industry software. These three areas are discussed in detail in Chapter VI of this report.



Engineering and scientific applications are expected to grow at the fastest rate. By 1993 they will make up a significant proportion of the cross-industry market.

Cross-industry education and training applications currently constitute a relatively minor segment of the market. They will, however, increase in importance over the next five years.

The “other” sector makes up a significant portion of the market. Included here are word processing, business graphics, sales and marketing and desktop publishing. The growth rate for these types of applications is expected to be high over the period 1988 to 1993.

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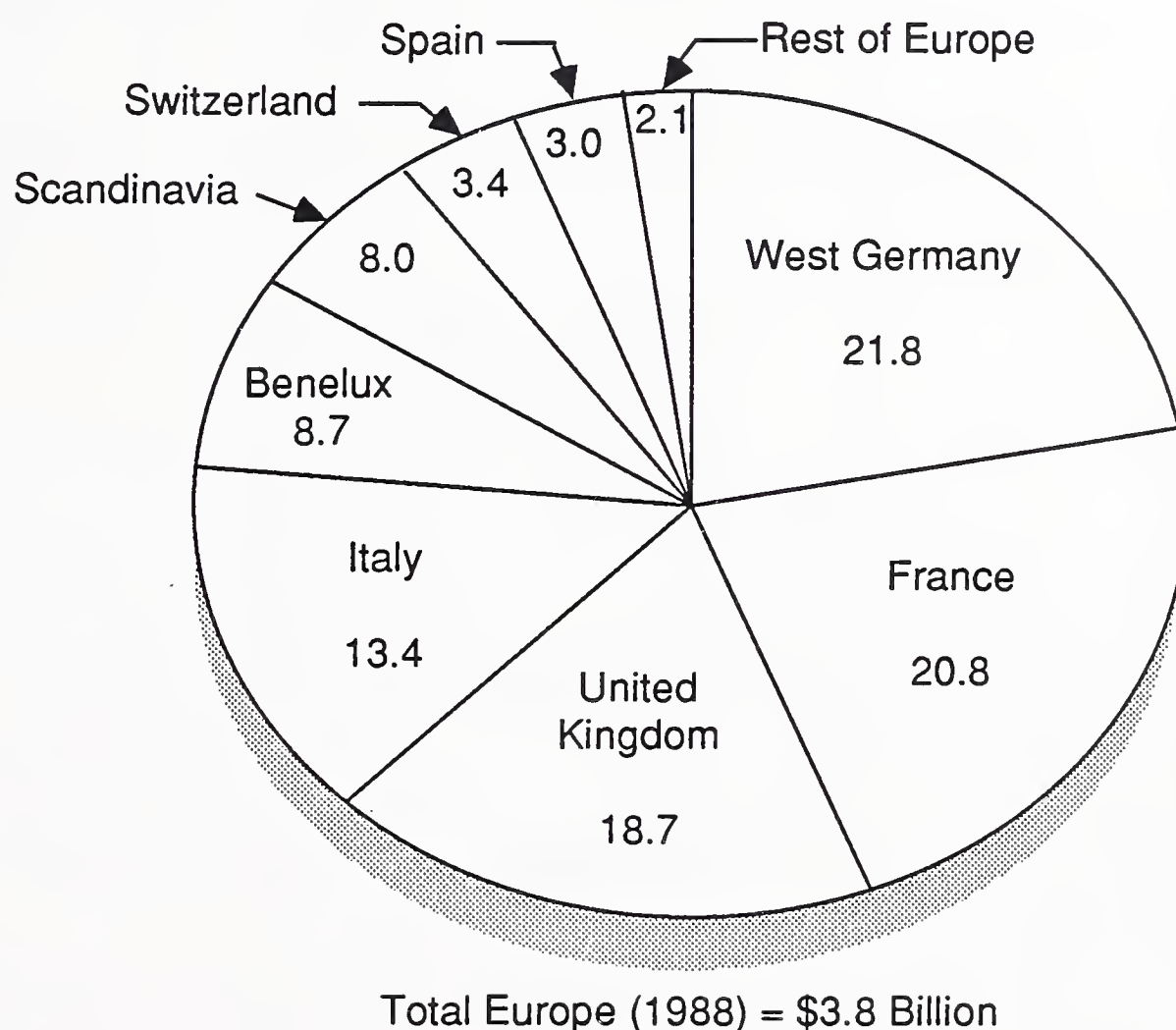
## G

### Comparative Country Markets

Exhibit III-10 shows the percentage distribution of end-user expenditures on applications software products by country markets expected during 1988.

EXHIBIT III-10

### APPLICATIONS SOFTWARE PRODUCTS MARKET IN WESTERN EUROPE PERCENTAGE DISTRIBUTION BY COUNTRY 1988



INPUT's forecast of the European market analysed by country for the period 1988 to 1993 is given in Exhibit III-11.

The two largest markets, France and West Germany, are expected to grow at approximately the European average rates, maintaining their importance in the market. The United Kingdom will remain in third position during this period.

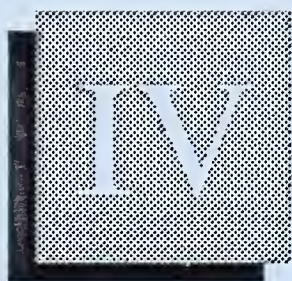
Of the remaining countries, Spain is most noticeable by virtue of its high growth rate. Spain has been a small market up to now, but by 1993 it will have grown significantly, and will become a major target market for applications software vendors.

The country markets are discussed in detail in Chapter V of this report.

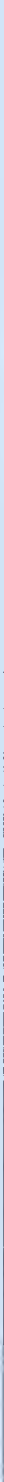
EXHIBIT III-11

### APPLICATIONS SOFTWARE PRODUCTS COMPARATIVE COUNTRY MARKETS

MARKET	MARKET FORECAST (\$ Millions)			
	1987	1988	1988-1993 AAGR (Percent)	1993
France	650	790	21	2,050
West Germany	680	830	21	2,115
United Kingdom	580	710	21	1,835
Italy	410	510	25	1,550
Benelux	270	330	21	855
Scandinavia	250	305	21	800
Spain	90	115	28	395
Switzerland	105	130	21	330
Rest of Europe	65	80	27	270
Total Western Europe	3,100	3,800	22	10,200

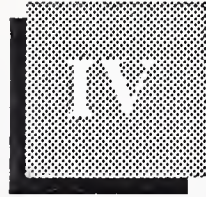


# Competitive Environment









## Competitive Environment

### A

#### Market Overview and Structure

##### 1. A Fragmented Market in Europe

Many industries, when looked at on a European scale, are fragmented. The software industry in general, but more particularly the applications software industry, is extremely fragmented due to the multitude of different applications that exist, and the varied requirements of users in different countries.

Three factors contribute significantly to the high level of fragmentation:

- Language differences
- Local laws and regulations
- Different accounting systems

These factors compel vendors to adapt their products, as well as their sales and marketing approaches, if they wish to sell in certain foreign markets.

Looking at the applications software market Europewide, there are few vendors that are strong in all countries. Only the major hardware manufacturers (notably IBM and Digital) could claim to have a strong overall presence, but in many cases they are providing applications software developed by other companies.

The main U.S. independent software companies have Europewide operations, with a few having a strong overall position (the most notable examples are Lotus, Microsoft and MSA).

When examining individual country markets, it is also evident that there are no dominant vendors. This is because there are so many application areas and because most companies concentrate on a specific type of application. There are, however, vendors that dominate in their specific activity. These are typically local companies whose business is mainly confined to their own country.

## **2. Vendor Picture**

INPUT distinguishes three main types of vendor organizations in the European marketplace—independent European-owned vendors, independent U.S.-owned vendors and hardware manufacturers.

Exhibit IV-1 shows the leading vendors of applications software products in Europe. All three types of vendors are represented in this list, with IBM having a clear lead (although the figure of \$240 million represents a very small proportion of IBM's total European revenues).

## EXHIBIT IV-1

# **LEADING APPLICATIONS SOFTWARE PRODUCT VENDORS IN WESTERN EUROPE**

RANK	COMPANY	MARKET SHARE PERCENT (ROUNDED)	ESTIMATED APPLICATIONS SOFTWARE PRODUCTS REVENUES IN EUROPE— 1987 (\$ Millions)
1	IBM	7.7	240
2	SAP	2.6	80
3	Lotus	2.4	75
4	Siemens	1.9	60
5	BIS	1.9	58
6 =	Microsoft	1.6	50
6 =	Olivetti	1.6	50
8	MSA	1.5	48
9	Digital	1.5	45
10	GSI	1.2	38
11	Nixdorf	1.1	35
12 =	Thorn Software	1.0	30
12 =	Groupe Bull	1.0	30
12 =	Unisys	1.0	30
15	McCormack and Dodge	0.9	27
16	ADV/ORG	0.8	25
17	Cap Group	0.8	24
18	Hewlett-Packard	0.7	22
19	STC/ICL	0.7	21
20	CCMC	0.6	20
	Others	67.5	2,090
	Total Market	100.0	3,098



Exhibit IV-2 lists the ten leading independent European-owned applications software product companies. The German real-time commercial software house, SAP, is the clear leader in this category.

EXHIBIT IV-2

### LEADING EUROPEAN-OWNED INDEPENDENT APPLICATIONS SOFTWARE PRODUCT VENDORS

RANK	COMPANY	COUNTRY OF ORIGIN	ESTIMATED APPLICATIONS SOFTWARE PRODUCTS REVENUES IN EUROPE—1987 (\$ Millions)
1	SAP	W. Germany	80
2	GSI	France	38
3	Thorn Software	U.K.	30
4	ADV/ORG	W. Germany	25
5	Cap Group	U.K.	24
6 =	CCMC	France	20
6 =	GEI	W. Germany	20
8	Thom 6	France	18
9	Sligos	France	16
10	CGI	France	15

Exhibit IV-3 shows the five main U.S.-owned independent applications software product vendors. The revenues shown include only their sales of applications software products in Europe in 1987. The leading company here is Lotus, followed by BIS (which, although U.K.-based, is owned by the U.S. company Nynex).

## EXHIBIT IV-3

**LEADING U.S.-OWNED INDEPENDENT  
APPLICATIONS SOFTWARE PRODUCT VENDORS—  
WESTERN EUROPE**

RANK	COMPANY	ESTIMATED APPLICATIONS SOFTWARE PRODUCTS REVENUES IN EUROPE—
		1987 (\$ Millions)
1	Lotus	75
2	BIS (Nynex)	58
3	Microsoft	50
4	MSA	48
5	McCormack and Dodge	27

INPUT's estimates of the applications software product revenues of the main hardware manufacturers are given in Exhibit IV-4. IBM evidently leads the ranking by a clear margin, followed by the European-owned companies Siemens and Olivetti.

The three categories of vendors are discussed below. IBM's particularly important role is looked at in some detail. There are also brief discussions on Digital, Siemens and Olivetti.

**a. Independent European-Owned Vendors**

The vast majority of companies in the marketplace come under this heading. Most are very small companies operating in one country only and selling products for a specific application area. These smaller companies very often aim at niche markets that are not considered big enough by larger vendors.

This category also includes large companies that operate internationally. It is interesting to note that few of the large independent European com-

EXHIBIT IV-4

### APPLICATIONS SOFTWARE PRODUCT REVENUES OF LEADING HARDWARE MANUFACTURERS WESTERN EUROPE

RANK	COMPANY	ESTIMATED APPLICATIONS SOFTWARE PRODUCTS REVENUES IN EUROPE— 1987 (\$ Millions)
1	IBM	240
2	Siemens	60
3	Olivetti	50
4	Digital	45
5	Nixdorf	35
6	Groupe Bull	30
7	Unisys	30
8	Hewlett-Packard	22
9	STC/ICL	21
10	Philips	20

panies base their businesses mainly on standard products. Most are professional services companies that provide custom solutions. They sell standard products, very often as components of an overall solution.

Exhibit IV-5 shows the leading professional services vendors in Europe. This exhibit is included because the companies listed are potentially important players in the applications software product market. (Many are already active in this area).

They are practically all European-owned, with French companies, in particular, strongly represented. The revenues given are INPUT's estimates of these companies' professional services revenues only (mainly custom software). It can be seen that the revenues generated by the top profes-



sional services companies far exceed those of the top applications software companies. Many vendors are, however, involved in both activities, and the two can be very much intertwined.

There is a lot of activity in the area of mergers, joint ventures and other partnership agreements among the larger independent European vendors. These agreements are now extending across national boundaries, leading to the creation of more "European" companies.

One of the most important recent examples was the merger of CAP Group (U.K.) and Sema Metra (France), both of which have application software product activities. Smaller companies are also becoming more international in their outlook and are seeking partnerships—for example, the German mainframe software house, DOS, worked together with the U.K. company, Systel, on the installation of its products in the U.K. This helped DOS acquire the market knowledge it needed to set up a U.K. subsidiary in August 1988.

These developments are discussed further in section B of this chapter.

#### **b. Independent U.S.-Owned Vendors**

On a European scale, independent U.S.-owned vendors are very significant, as can be seen from Exhibit IV-1. Lotus, MSA and Microsoft, are prominent in this list. Their revenues are spread across Europe, and hence they would not be in such elevated positions in individual country ranking tables.

The American suppliers of mainframe products face strong competition from European-owned vendors. For certain low-cost PC packages, on the other hand, American independent vendors have a very strong position. This position has been achieved not only by providing the right products, but also by having the marketing ability to exploit such markets.

Most of the large American independent vendors have subsidiaries in the major European countries. But the PC software companies do not usually sell directly to the end users, preferring to use distributors.

Some independent American vendors do not have a direct presence in certain European countries, but work through a local agent. Working through a local agency is often a first step for American companies in Europe, before they take further moves and set up their own subsidiaries. Cullinet, for example, set up a German office in 1987, having sold through ADV/Orga for a number of years.



There are also many smaller American independent vendors who sell through distributors in Europe. Mainly because of language reasons, these companies are most successful in the UK. For example, the U.K. company, Trifid Software, which publishes its own applications software products, also represents the U.S. software houses The System Works Inc. and The Ultimate Corp. Similarly, Safe Computing Limited represents Midec and Mitrol, in addition to marketing its own products.

Professional Services company Arthur Andersen (one of the “Big 8” accounting firms) features prominently in Exhibit IV-5. It has recently announced its intention to concentrate more on standard applications software. This trend may well be adopted by other professional services companies.

### **c. Hardware Manufacturers**

It has been made clear by the major hardware manufacturers (not least IBM and Digital) during the past year or two that they are concentrating their efforts more on software than before. Although this trend is significant, two points should be borne in mind:

- The hardware manufacturers’ software revenues have historically been predominantly from systems software.
- The leading hardware manufacturers have not attempted to capture market share for a wide range of applications software. They have their own products for a certain number of applications, but are not able to provide the software solutions for all customers’ requirements. Hence most independent applications software vendors are not directly threatened by IBM and Digital. They should try rather to engage where possible in mutually beneficial partnership agreements.

#### *i. IBM*

IBM’s success as a provider of applications software products has in the past been considered rather limited, compared to its overall impact on the information services market. However, IBM is still the dominant player (as shown by Exhibit IV-1) and it is stepping up its efforts in this area.

In July 1987 IBM announced the establishment of a new organisation called the Applications Systems Division (ASD) as part of a long-range plan to become a major supplier of applications software.

## EXHIBIT IV-5

# **LEADING PROFESSIONAL SERVICE COMPANIES, 1987 WESTERN EUROPE**

RANK	VENDOR	COUNTRY OF ORIGIN	ESTIMATED PROFESSIONAL SERVICES REVENUES (\$ Millions)
1	Cap Gemini Sogeti	France	390
2	Finsiel	Italy	230
3 =	Volmac	Netherlands	200
3 =	Sema Metra	France	200
5	SCICON	U.K.	174
6	Arthur Andersen	U.S.	140
7	CISI	France	126
8	CAP Group	U.K.	110
9	Steria	France	95
10	Logica	U.K.	74
11	Sligos	France	70
12	CGI	France	65
13	Systems Designers	U.K.	57
14	Thorn EMI IT	U.K.	56
15	SODETAG TAI	France	55
16	Syseca	France	54
17	Sopra	France	52
18	SG2	France	50
19 =	GSI	France	49
19 =	EDV-Ploenzke	West Germany	49

Notes: (1) Sema Metra and CAP Group have now merged to form Semacap.  
 (2) Systems Designers acquired SCICON to form SD-SCICON.

The two functions to be served by the new division are:

- The co-ordination of IBM's software development worldwide
- The acquisition from independent software developers of application software products in key market segments, including office systems, computer-integrated manufacturing (CIM) and financial systems.
- IBM has stated that it will focus on selected vertical-market segments and does not intend to provide cross-industry applications.

Independent vendors active in some vertical markets can therefore expect some competition from IBM. Third-party developers in cross-industry markets have been assured by IBM that there will be no competition between them.

In general, IBM is trying to improve relationships with third-party suppliers. It recognises that it needs relationships with software suppliers in order to continue growing. IBM has, for example, been holding regular meetings lately in the UK with third-party software suppliers.

Among IBM's major strategic moves involving independent applications software companies have been:

- IBM acquired exclusive US marketing rights to the packages of Hogan, a banking software specialist (late 1986).
- IBM signed an accord with Lotus for technical and commercial co-operation (May 1987). The first result of this agreement is the development of a Lotus spreadsheet product for the IBM 370.

In Europe also, IBM has introduced new marketing schemes in order to get more of a foothold in the software market. One of its initiatives aimed at software houses is the offering of discounts on machines bought for software development. IBM is also offering hardware and software loans, and formal arrangements for joint bids to prospective customers.

IBM operates an Agents Programme in Europe. These agents, who concentrate on particular geographic or application areas, sell their own software products, together with IBM hardware. IBM maintains close control of their activities.



The general strategy of IBM in Europe is determined by the overall corporate strategy. But, because local requirements differ, the individual country operations make decisions on such things as local software product sourcing and development. Many strategic applications products, such as manufacturing and office packages, come from the US, whereas IBM's local partners often provide other products.

Another major announcement by IBM in the last two years concerned its Systems Application Architecture (SAA). SAA promises to provide the same application environment for IBM's main strategic processor families. If software companies could market essentially the same version of a package to all IBM customers, it would be even more attractive to write for IBM systems than it is now. However, SAA is still only a plan, and one must wait for IBM to demonstrate SAA's technical viability.

IBM also declared recently (February 1988) that UNIX will be a key strategic element of its product line. In May 1988 The Open Software Foundation (OSF) was founded, with IBM one of its eight sponsors. Its primary aim is to develop an alternative UNIX standard. This has come at a time when the UNIX market is becoming too large to ignore, and IBM appears to have been forced to follow it.

## *ii. Digital*

Digital has for some time had different formal and informal marketing arrangements with software houses. The most significant of these is its Complimentary Marketing Programme (CMP).

Through CMP, Digital has assembled over 100 software houses and OEMs, which together produce about 300 packages targeting vertical markets such as accounting, health care and scientific development.

Digital recognises that it cannot provide all the applications software itself. By encouraging independent software companies to develop software for Digital equipment, it can build up the right portfolio and leverage hardware sales. Both in the US and Europe, Digital is continuously seeking new independent software developers to work with.

Digital maintains industry groups to keep tabs on developments in particular vertical markets. In Europe, these groups are based in different countries. For example, the Services Industry Group, which is based in London, is responsible for looking at Digital's portfolio of products (both internally and externally developed) for this industry, and ensuring that the portfolio is constantly enhanced.



Digital's standards for admission to its CMP group are strict. Applicants must show an existing base of satisfied customers, maintain a sales and support force, and prove recognised leadership within a particular market. Each product must pass Digital's technical examinations. CMP applicants must also be able to prove their financial stability.

Digital's own revenues from applications software are small. Digital does not see itself as competing directly with most of the independent software developers, and most of the independents do not openly express any major concerns.

However, it cannot be ruled out that Digital will take on the applications software market in the next few years. It is now dependent on third parties to supply this need. As the market grows, it becomes very attractive from Digital's (and other hardware manufacturers') points of view.

### *iii. Siemens*

Siemens is the second largest vendor of hardware in Europe after IBM. It is particularly strong in West Germany, where it enjoys a virtual monopoly on government purchases.

Applications software products for Siemens mainframes have, in the past, mainly been supplied by third-party vendors (such as SAP, ADV/Orga and DOS, for example). Siemens formerly had a cooperation deal with SAP to sell its software products.

However, Siemens has now begun to develop more of its own standard applications software products, particularly for banking and CIM applications.

### *iv. Olivetti*

Olivetti is the leading hardware company in the Italian market, making Italy the only European country where IBM does not have the top position.

Olivetti's 1987 revenues were disappointing, showing little over 1% growth over 1986; profits for the year were down nearly 30%.

On the hardware front, Olivetti is now planning to shift its emphasis from PCs to minicomputers. It is also concentrating its efforts on the software market, and has acquired several companies over the past few years.

Olivetti owns Syntax, one of Italy's main applications software product companies. During 1987 Olivetti launched a line of PC applications software called Olisoft Library. The company is expected to continue its expansion in the applications software area over the coming years, particularly in the Italian market.

## **B**

### **Vendor Marketing Developments**

#### **1. Partnerships**

There is a growing recognition amongst applications software vendors of the benefits to be gained from working in partnership with other companies.

Partnerships can take many forms. They may simply be informal arrangements between companies, whereby each recommends the other's products to customers. In other instances, partners may have official joint marketing agreements. In extreme cases, the companies merge totally to form one company.

Some comments made by vendors on the subject of partnerships are shown in Exhibit IV-6.

INPUT's research has highlighted three major types of partnership arrangements that are being practiced in Europe. These are classified according to the type of companies involved.

##### **a. Partnerships between Software Houses**

Software companies often find that co-operating with other vendors opens up opportunities that would otherwise remain closed. The two partners involved need to have attributes that compliment each other, so that the combination of resources results in an overall gain for both parties.

The most common way in which software houses work together is to cooperate in a joint marketing/distribution agreement.

This involves vendors selling each other's products. It is essentially a joint agreement whereby each partner improves its product portfolio, and each company's exposure to the market is increased.

## EXHIBIT IV-6

**VENDOR COMMENTS ON PARTNERSHIPS**

We cannot supply software for every application. We believe that by having good relationships with small software companies, they can leverage business for us.

- *U.S. Hardware Manufacturer*

The decision to acquire or not acquire a software company depends on their strategic value to us. In most cases, an informal or formal marketing agreement, or a joint venture, is enough.

- *U.S. Hardware Manufacturer*

We have a good relationship with IBM. We have a partnership whereby they sell our software. We see IBM potentially as a threat in the future. But, at the moment their software is not of a sufficiently high quality.

- *West German Independent Software Vendor*

Our ultimate aim is to get the hardware manufacturers to take our products on their portfolio.

- *Independent UNIX Software Company*

I believe that, by confining ourselves in the past to ICL machines (without any formal agreement with ICL, however) we limited our market significantly.

- *Independent Banking Software Company*

We have very few applications software products of our own, but have hundreds of third-party products in our catalogue. We are actively seeking new products from independent vendors in Europe.

- *U.S. Workstation Manufacturer*

I believe that software companies should actively look for partners, and use intermediaries to help them find suitable partners if necessary.

- *West German Independent Software Vendor*



This type of arrangement is a variation of the software developer-distributor set-up. In most cases, the software developer will need access to good distribution channels, which can be provided by specialist software distributors.

In any arrangement where one company distributes another's products, it is important to remember that service, support and maintenance will be required in addition to the marketing and sales effort. It is therefore very important to be selective in the choosing of partners. One German applications software vendor said on this subject: "We present a quality image to our customers. Hence we will only work with partners who have an equally high reputation for quality. Otherwise we lose our credibility".

Joint marketing agreements, whether involving two software developers or one developer and one distributor, are of particular interest to companies wishing to enter foreign markets.

As an initial step into such markets, it is advisable to work with people who are familiar with the market. The most common way is to sell through a distributor. INPUT's research revealed, however, that many vendors prefer to work with other software houses in foreign countries. These companies can be in a position to give advice on market requirements and the adaptation of products for the local market. The subject of international partnerships is discussed further in section 2 below.

A number of companies interviewed by INPUT that are actively seeking partners. They indicated that this process is facilitated by using independent intermediaries or consultants who have a broader view of the market and an understanding of what is involved in such partnership arrangements.

The following are three very different examples of partnerships involving software houses that INPUT has identified:

- The American PC software company Ashton Tate has an agreement with the French software house, La Commande Electronique. The agreement involves the French company in translating and distributing Ashton Tate's software for the French-speaking market. The agreement, which runs until the end of 1989, appears to have been a success, with over 70,000 Ashton Tate products sold to date in France.
- In Switzerland, five software companies came together in early 1988 to form Industry Software AG (ISAG). The aim of the accord is to com-



bine development resources and improve each partner's penetration of all three linguistic regions of the country, as well as the export markets.

- Germany's leading applications software products company, SAP, which is growing very rapidly, formed a partnership in 1987 with Arthur Andersen GmbH. SAP found it difficult to recruit enough professional staff to keep pace with its growth. Hence a cooperation agreement to implement SAP software in Germany was reached with Arthur Andersen. (This fits with Arthur Andersen's corporate move into software products.)

#### **b. Hardware Manufacturer–Software House Partnerships**

Traditionally applications software has not been a major source of revenue for hardware manufacturers.

However, these companies are now becoming more active in this area, mostly because they see how important it is for hardware sales to provide the necessary software, but also because of the increasing value of the software market itself.

Most of the applications software that runs on their hardware is developed by third-party developers. The hardware manufacturers themselves are now doing more applications software development, but they can satisfy only a small proportion of the total demand. Hence they must have partners that can provide software to satisfy customers' demands.

As discussed in section A of this chapter, Digital and IBM have marketing programmes that they run with software houses. Another, Olivetti, is getting increasingly involved in partnerships with software developers. All the main hardware manufacturers are actively seeking partners.

On the product development side, most of IBM's cooperation ventures are with U.S. companies. One of IBM's most important such agreements was signed in May 1987 with Lotus.

IBM, however, also works jointly with European companies on product development. It has, for example, recently subcontracted the development of a software product for the proposed U.K. community charge. This product will be sold under the IBM name.

Marketing agreements and other forms of co-operation between hardware manufacturers and software houses can provide opportunities for

both parties involved. In the main, the hardware manufacturers and software houses interviewed by INPUT did not think the two normally compete directly. Small software houses are in a much better position, for example, to exploit specific market niches, and getting their products on the portfolio of a major manufacturer opens up a much bigger market.

According to one hardware manufacturer interviewed by INPUT, the extent to which the relationship between two such partners is binding depends on the “strategic value” of the software house to the manufacturer’s business. The agreement may be an informal referral arrangement or a formal joint venture. Only rarely in these partnerships is the software house acquired by the hardware company.

### **c. Software House—Client Partnerships**

A less common type of partnership is the type in which a software house works together with a client on the development of a custom solution, which is then made into a standard software package.

Some examples of this type of agreement are:

- The U.S. software supplier Continuum worked with a number of U.S. insurance companies on the development of a package for insurance companies. The package, called CCA, is expected to be used by most of the big UK insurance companies when it becomes available, at a cost of between \$600,000 and \$2.2 million.
- The French company, CGI Informatique, bases its product development very much on working with clients. Its best-known product, the “Pacbase” development tool, resulted from the company’s experience with a number of customers. The same is true of its “Sigagip” range of human resources and financial management products. CGI also worked with the French company SEP on the development of a package for the management of technical data. SEP will receive a certain percentage of the revenues for this product. CGI’s approach to expansion relies very much on this approach.

In West Germany, several software houses are owned or partly owned by industrial groups (e.g., IKOSS by Thyssen and Softlab by BMW). A significant proportion of these companies’ business is derived from their parent companies, providing an interesting opportunity for cooperation on new product development.



A typical procedure for joint vendor-client product development might be as follows:

- A vendor sees a need (perhaps in a particular company) that could be satisfied with a standard applications software product. This need is potentially an application that could benefit many companies.
- Hence the vendor approaches the user company and proposes that they jointly develop a solution. They agree that this solution can be made into a standard product, with the user getting a share (say 20%) of the revenues from product sales.

This approach is usually adopted only for mainframe applications, and there may be only two or three other sales of the product. Even so, the revenues generated should justify this approach.

It may also be possible for software houses to use their custom software development experience to develop standard products without engaging in an agreement with a client. Vendors should, however, be aware of the possibility of clients objecting if they think they have contributed to the development of a product without benefiting themselves.

## **2. Internationalisation**

As discussed in section of this chapter the European market for applications software products is very fragmented. Compared to the U.S. market, it is very difficult for vendors to achieve a significant market share. As one American vendor commented: "The oil is there; it's just tougher drilling!"

Because of the small size of the individual country markets (particularly for "niche" products), European software vendors that want to expand have to look beyond their own national boundaries.

Some vendor comments on language and country differences are listed in Exhibit IV-7.

Products are normally initially developed for the home market, and therefore in the developer's native language. In most cases (apart from some technical applications), the user interface and documentation will need to be translated for foreign markets. Translation can give rise to quality problems, and thus needs to be approached in a very professional manner.

## EXHIBIT IV-7

**VENDOR COMMENTS ON LANGUAGE  
AND COUNTRY DIFFERENCES**

Language is by far the greatest barrier, especially for small companies.

*- U.S. Hardware Manufacturer*

The translation of products (user interface and documentation) can easily give rise to quality problems. Poor translation means poor-quality software. Hence it should be done in a very professional manner.

*- West German Independent Vendor*

I believe that different country tax laws and regulations pose more of a problem for us than language differences.

*- Independent U.S. Vendor*

The need to translate products adds significantly to the cost of entry to a foreign market.

*- U.S. Hardware Manufacturer*

Different country regulations are not as big a problem as language. The EEC has broken down a lot of differences, and this will happen more and more.

*- U.S. Hardware Manufacturer*

We believe that "1992" will result in the European market reaching a critical mass. We are preparing ourselves for this. Even if "1992" causes nothing to change, we will still benefit from our efforts in this area.

*- Independent European-owned UNIX Software Vendor*

One of Europe's leading applications software companies, SAP, sells basically the same product worldwide, but the user can choose which language to work in (a choice of six). This freedom gives SAP a great advantage when selling to multinational companies.

Although language is a major problem (especially for smaller companies), legal and administrative peculiarities in different countries can be just as important. Different taxation systems, for example, can provide



difficulties for vendors of payroll packages. (In Switzerland, for example, each person settles his or her own tax bill with the state.)

Within the EEC, however, the movement towards the creation of a barrier-free market in 1992 should speed up moves towards a more uniform marketplace. Standardisation in certain areas will potentially create new opportunities for software vendors.

A number of vendors interviewed by INPUT for this study indicated that they were keeping the 1992 initiative very much in mind, and are already reviewing their strategies in this regard.

To break into foreign markets, software vendors can either sell through agents/distributors or set up a subsidiary.

Some PC software companies whose products are totally standard and require no modification (e.g., Lotus, Microsoft) sell mainly through distributors.

In many cases, especially where modification (for the particular foreign market and individual customer) is required, INPUT suggests that partnerships with other software houses (or professional service companies) are more appropriate. The two companies may be able to work closely together and complement each other's product range.

Two companies that adopted this type of approach in Europe were the American companies Cullinet and Ashton Tate.

In Germany, Cullinet broke into the market via ADV/Orga, one of the biggest local software houses. ADV/Orga distributed and supported Cullinet's products in the German-speaking markets. Cullinet subsequently set up its own German subsidiary (in 1987).

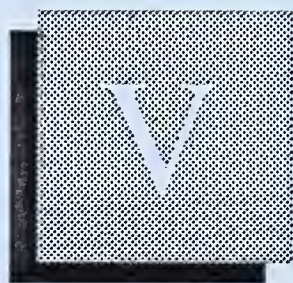
Ashton Tate has an arrangement with La Commande Electronique in France (as mentioned in section 1a above) whereby the French company translates and distributes Ashton Tate's products in France. The contract expires in 1989.

When a vendor has little or no first-hand experience of a foreign market, it can be difficult to set up a wholly owned subsidiary. This can be done after breaking into the market through a distributor or partner. Software vendors should be aware of the need to have a consistent image across different countries, but at the same time to portray a national understand-

ing in individual countries. This means having nationals of the country running the subsidiary where possible, rather than imposing people from one's own company.

British companies usually find it easier to break into markets in the Netherlands, Scandinavia and West Germany than into those in the Southern European countries, mainly for language reasons. French companies, on the other hand, find it easier to sell in Switzerland, Belgium, Italy and Spain.



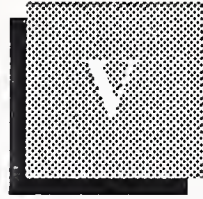


# Country Markets









## Country Markets

### A

#### France

##### 1. Background

INPUT estimates that the French market for application software products was worth FF 4.0 billion in 1987. As illustrated in Exhibit V-1, this is expected to increase to FF 4.8 billion in 1988, and to grow at an average annual rate of 21%, reaching FF 12.6 billion in 1993.

The French realised relatively early that the European market for customised and semi-custom software is as big as that of the US; their government was quick to take the view that its software purchasing power would be more effective if directed to the benefit of homegrown producers. In contrast to the U.K. government, the French administration let its software contracts go out-of-house, instead of setting up ministerially managed software teams.

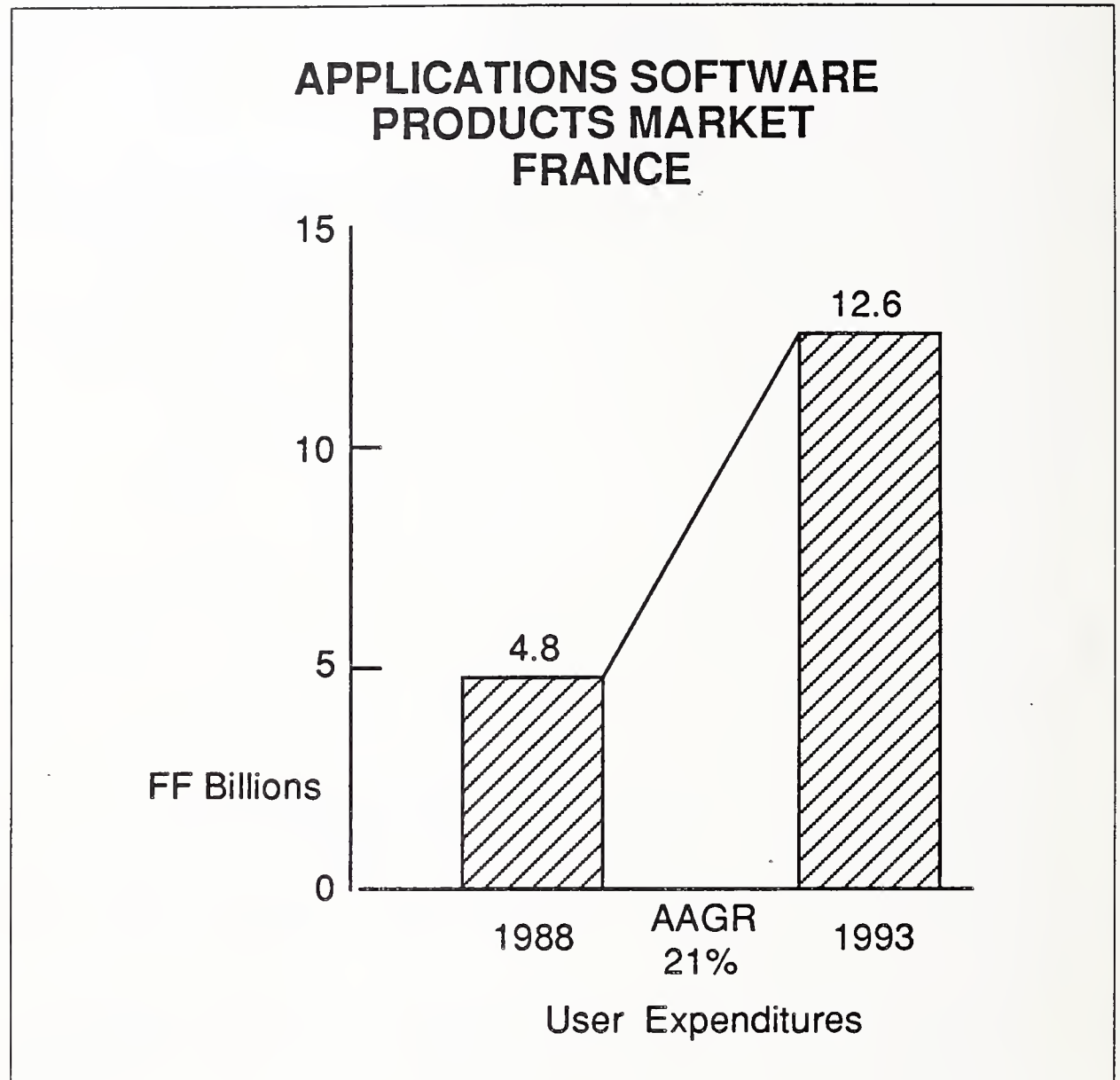
The development of software is an activity that requires a significant amount of abstract thinking, something that suits the French mentality. This has helped the software market in France grow to be the largest in Europe.

A very high proportion of French software is custom developed. The share of the market taken by standard packages is much lower than in West Germany or the UK, for example.

##### 2. Competitive Environment

France has several very large independent information services companies (SSIIs) that provide mainly professional services. By far the largest

EXHIBIT V-1



of these is Cap Gemini Sogeti (Europe's largest independent information services company). Among the other big ones are Sema Metra (now merged with CAP Group), Sligos and GSI.

These companies also sell standard applications software products as part of their offerings, but for most of them, it provides a relatively small proportion of their income.

Of the top French SSIs, GSI and CCMC are most prominent in the applications software product rankings.

A ranking of the top 10 independent applications software product companies in France is given in Exhibit V-2. The figures given are INPUT's estimates of these companies' standard product revenues.

GSI had revenues of approximately FF 225 million for application software products in France in 1987. This revenue was derived mainly from the following areas: payroll, business management, production, account-

ing, and the motor trade. GSI, which was sold recently to its staff and management by Alcatel, also earns significant revenues abroad.

CCMC earns most of its applications software revenues from products for chartered accountants and their clients. The company was the object of an unsuccessful takeover bid by one of its main competitors, Cegid, in late 1987. The vast majority of CCMC's revenues come from France.

Concept SA is unusual among the French companies in the ranking in that most of its revenues are from standard products. (Its total revenues in 1987 were under 200 million FF.) These are mainly financial applications products for large companies. Concept is growing very rapidly, mainly through acquisition.

American companies feature prominently in the ranking, e.g., Microsoft, Lotus. France is a very important market for Microsoft. The majority of the company's revenues are for systems software (which are not included here). A substantial proportion of the figure given in Exhibit VI-1 is for word processing software.

Although many French computer service companies earn significant revenues outside of France (e.g., Cap Gemini Sogeti, Sema Metra, GSI), there is very little earned abroad for standard applications software products. This is largely due to language reasons.

The software copyright laws in France have tightened considerably over the past few years. A number of users interviewed by INPUT complained that software is getting more expensive because of these increasing restrictions. This development should be beneficial to vendors.

Companies wishing to sell software products in France should be aware of the absolute necessity to have their products in the CXP directory. This is the "bible" of software products, and is consulted widely by users.

INPUT's research revealed a high number of users in France who complained of the lack of good documentation in French. Vendors should remember that English is not very acceptable in France.



## EXHIBIT V-2

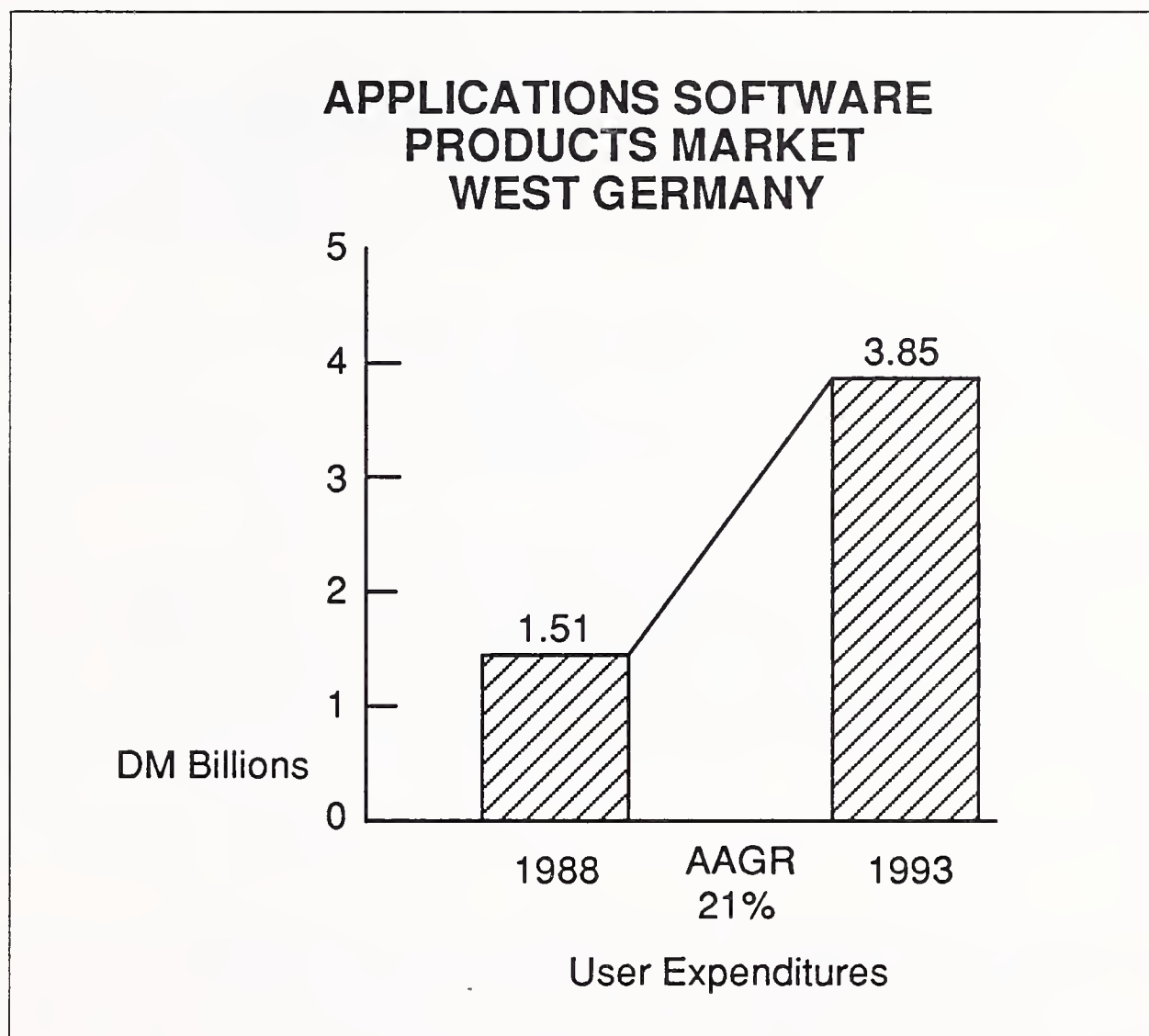
**TOP VENDOR RANKINGS, 1987**  
**APPLICATIONS SOFTWARE PRODUCTS**  
**FRANCE**  
**(Independent Vendors)**

RANK	VENDOR	ESTIMATED REVENUES (FF Millions)
1	GSI	225
2	CCMC	120
3	MICROSOFT	105
4	CONCEPT SA	103
5	LOTUS	100
6	CGI	90
7	SLIGOS	80
8	THOM6	75
9	MCCORMACK & DODGE	63
10	MSA	62

**B****West Germany****1. Introduction**

INPUT estimates that the West German market for applications software products in 1987 was worth DM 1.24 billion. As shown in Exhibit V-3, this market is expected to increase to DM 1.51 billion in 1988, and to increase at an annual average rate of 21%, reaching DM 3.85 billion in 1993.

EXHIBIT V-3



West German companies have traditionally had a preference for in-house-developed software. However, many are now shedding this reluctance for using software developed elsewhere. This reflects the improved range and capabilities of software packages available and the difficulties involved in maintaining an in-house development staff.

Consequently, standard applications software is a major growth area in West Germany. One major German vendor interviewed by INPUT expects about 75% of commercial software to be standard by 1990 (from under 65% in 1985).

Exhibit V-4 lists the leading applications software product vendors in West Germany (standard product revenues only).

## EXHIBIT V-4

**TOP VENDOR RANKINGS, 1987  
APPLICATIONS SOFTWARE PRODUCTS  
WEST GERMANY  
(Independent Vendors)**

RANK	VENDOR	ESTIMATED REVENUES (DM Millions)
1	SAP	110
2	ADV/ORG	55
3	Microsoft	54
4	Lotus	50
5 =	Cullinet	25
5 =	Taylorix	25
7	Krupp Atlas	22
8	DOS	20
9	MBP	16
10	Softlab	15

## 2. Manufacturing

The strength of manufacturing industry in West Germany means that this sector is particularly important for software developers. CAD/CAM applications, for example, are a high priority in West Germany.

As is normally the case for such applications, users' requirements vary considerably, and standard products rarely suffice. One consequence is that several major West German industrial groups have taken shareholdings in software houses, in order to have a close partner to implement

applications. Among the most important such partnerships to have been established or strengthened over the past year are Thyssen-IKOSS, BMW-Softlab and Daimler Benz-GEI. Other major manufacturing software houses owned by industrial groups are Krupp Atlas Datensysteme (Krupp group) and MBP (Hoesch AG).

These relationships provide benefits for both parties, but some areas of conflict can arise. For example, the software house can often be working for direct competitors of its parent company. On balance, however, the companies involved see the advantages to be more significant.

INPUT's discussions with German software houses supplying manufacturing industry have indicated that there is much potential in this market. There is growing activity in areas like production control and CAD/CAM, but the market is far from saturated. Companies are realising the need for automation, they see that it can be done, and are willing to put in the investment.

### **3. Banking and Finance**

As with manufacturing, most applications for the banking and finance sector are provided by professional services companies, including IKOSS, Softlab, EDV Studio Ploenzke, SCS (SD/Scicon) and Schumann. The banks themselves have also taken an interest in software houses. In 1987, for example, Deutsche Bank took a major shareholding in Roland Berger & Partner, a leading German management and DP consultancy firm.

### **4. Cross-Industry Applications**

The two largest independent German-owned software houses in the commercial/cross-industry applications software field are SAP and ADV/Orga. The two compete directly in some areas, but their fortunes have been very different over the past few years.

SAP's turnover has increased more than ten-fold since 1980, reaching about DM 145 million in 1987. It has established itself as a high-quality developer of real-time commercial applications software products.

ADV/Orga, which is a publicly quoted company, has also enjoyed steady, through unspectacular, growth in revenues. It has had some problems, however, and suffered a loss of DM 3.5 million in 1986/87 on total revenues of DM 87 million. One of the major reasons for this loss was the termination of its distribution agreement with Cullinet.



All the major American software vendors are represented in West Germany, either through distributors or with their own offices. Cullinet and MSA are among the strongest in the mainframe applications area, but they are not seen by their German competitors as a real threat at the moment.

## C

### United Kingdom

#### 1. Background

The U.K. market for applications software products is estimated by INPUT to have been worth £345 million in 1987. This is expected to increase to £420 million in 1988, and to grow thereafter at an annual average rate of 21%, to reach £1,080 million in 1993. This projection is represented graphically in Exhibit V-5.

EXHIBIT V-5

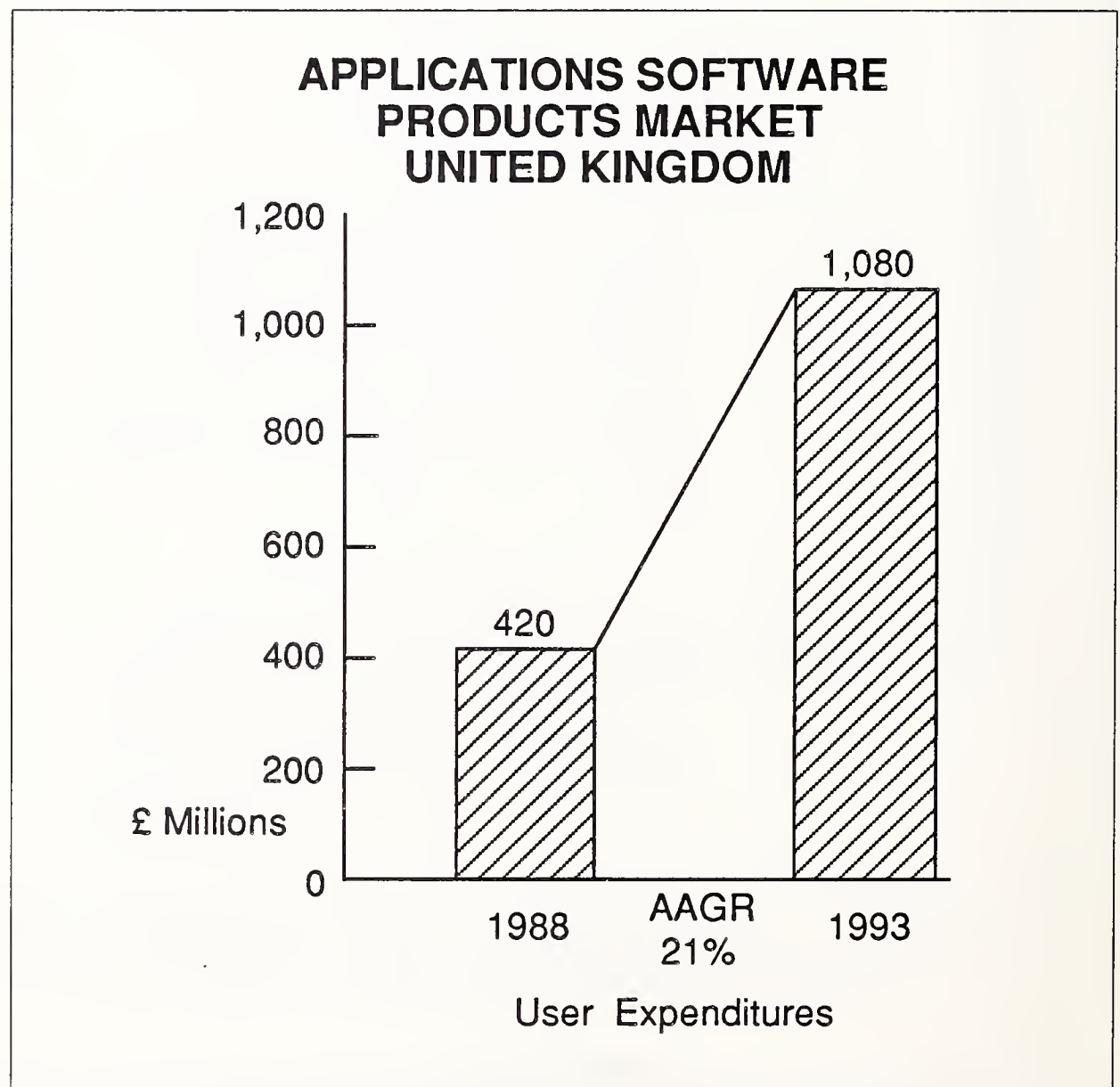


Exhibit V-6 lists the top 10 applications software product vendors in the U.K. marketplace. U.K.- and U.S.-owned companies are equally represented.

EXHIBIT V-6

**TOP VENDOR RANKINGS, 1987  
APPLICATIONS SOFTWARE PRODUCTS  
UNITED KINGDOM  
(Independent Vendors)**

RANK	VENDOR	ESTIMATED REVENUES (£ Millions)
1	BIS	20
2	Thorn EMI Software	15
3	CAP Group	11
4 =	MSA	10
4 =	Microsoft	10
4 =	Lotus	10
7 =	McCormack and Dodge	8
7 =	Hoskyns	8
7 =	CMG	8
10	CCF	7

## 2. Competitive Environment

The software market in the U.K. is thought by many vendors to be the most competitive in the world. In addition to British vendors, there is a high concentration of American, and more recently Australian, vendors. For these companies, the U.K. is very often the first foreign market they tackle.

The vast majority of software packages sold in the U.K. are of U.S. origin. To date, U.K. companies (and other European companies) have, by and large, failed to make their mark in packaged software, partly because of the lack of marketing skills that their U.S. counterparts have.

There are a few notable exceptions to this. BIS and Thorn EMI Software, for example, have been successful on an international basis, but in comparison to U.S. standards, they have been relatively limited successes.

British companies on the whole have been much more successful in building custom software than standard products.

One vendor interviewed by INPUT pointed out that the structure of British industry is different from other countries, and hence it needs to be approached differently. There are more conglomerations of companies in the U.K. Companies are now decentralising their systems, whereas in many other countries they are only now getting to the stage of centralisation (i.e., concentration in industry started later). This situation consequently affects the type of software required by users.

U.K. firms have been more successful with software packages for certain PC applications (particularly for the Amstrad IBM compatible PC) than for mainframe applications. This type of development requires less investment, and costs can be recouped by selling high volume at low cost.

## D

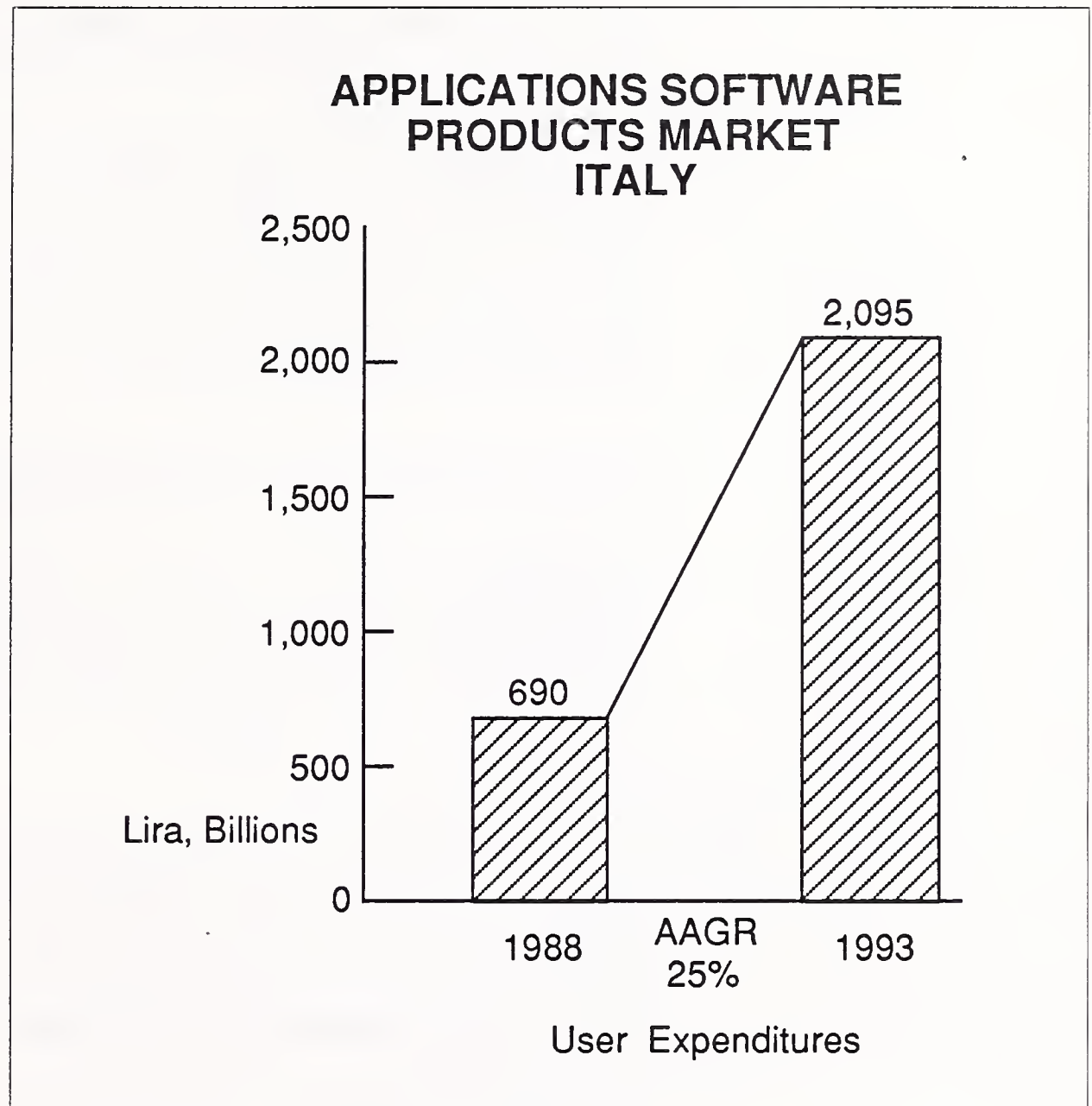
### Italy

#### 1. Introduction

INPUT estimates that the Italian applications software products market was 555 billion lira in 1987. As illustrated in Exhibit V-7, the market is expected to increase to 690 billion in 1988, with future growth anticipated at 25% for the period 1988 to 1993.

The Italian economy is characterised by a large proportion of small companies—a much higher proportion than in the other major European countries. This demographic pattern means that the types of computers being used in business in Italy are typically small and midrange machines, with a smaller proportion of mainframes.

EXHIBIT V-7



## 2. Software Piracy

There is accordingly a greater demand for software for such computers. However the size of the Italian market for software, and particularly for PC software, is significantly lower than what it should be, due to widespread copying of programmes.

There are no laws forbidding software piracy in Italy. Hence piracy is taking place on a large scale. It is suspected that many companies only buy part of their software requirements and copy the rest. According to the manufacturers, actual sales of some products are only about a fifth of real consumption. Many Italian users regard computer hardware as the real tool and think of the software as an incidental, though essential, adjunct. While the copying and exchange of software among private



users is not peculiar to Italy, it is a more widespread practice there among business users than in other countries.

This problem is most common with small and medium-sized businesses. Multinationals are more likely to work by the book and buy all of their software. For mainframe software also, the problem is not so drastic. Users cannot simply copy this type of software and use it. They require the support and maintenance that in most cases can only be provided by the software company that produces it.

For companies like Lotus and Microsoft, however, piracy is a major problem, and will continue to be until legislation is introduced.

The Italian Prime Minister's advisory council on informatics has drafted a proposed law to outlaw software piracy, but political crises and other priorities are ensuring a long delay before it is put to Parliament.

### 3. Competitive Environment

The two major players in the Italian applications software market are Olivetti and the Finsiel Group. Both have been very active in the mergers and acquisitions area over the past year or two. Olivetti in particular has been very involved in alliances with Italian software houses. Its software product activities are centred mainly around its G4S subsidiary.

Finsiel has also been active. It has shares in several companies in the software products business including Italsiel and Data Management, for example. Its business is, however, still mainly in the custom software area for mainframes, and only a small proportion is standard packages.

The packaged software market in Italy is still very fragmented. It is a characteristic of the Italian software market that many of the vendors belong to large groups. Hence there is a high proportion of captive revenues, especially for custom software.

Foreign applications software companies wishing to sell their products in Italy need to be able to provide the documentation and user interface in Italian. An exception is for technical applications, where in many cases English is acceptable.

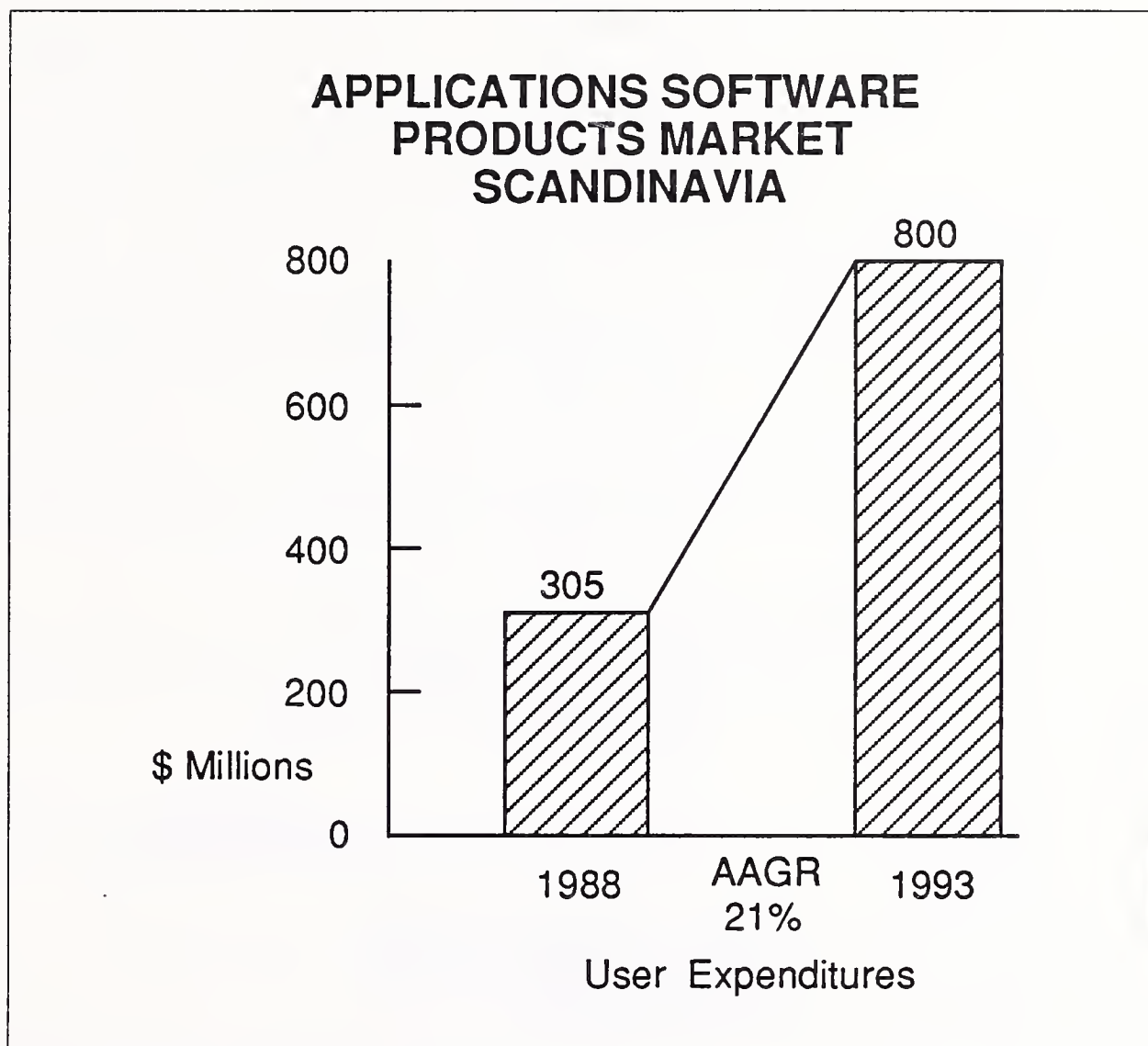
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## E

### Scandinavia

The Scandinavian market for applications software (made up of Sweden, Norway, Finland and Denmark) is estimated by INPUT to have been worth \$250 million in 1987. As shown in Exhibit V-8, this revenue is

EXHIBIT V-8



expected to increase to \$305 million in 1988, and to grow at an average annual rate of 21%, reaching \$800 million in 1993.

One common characteristic of the Scandinavian markets is the high proportion of software and service companies owned by banks and other corporations.

### 1. Sweden

The Swedish market is the largest in Scandinavia. Foreign applications software companies normally need to supply products in Swedish for common end-user applications. One Swedish vendor pointed out that foreign companies face problems due to the different Swedish keyboard.

Few Swedish applications software companies export their products. Two exceptions are Ide Data, whose "Graph in the box" product has been sold widely abroad, and Hogia Data, which offers its products in seven languages.

One vendor reported that UNIX is very advanced in Sweden. This is partly due to the government pressure to force standards.

## 2. Norway

Norwegian vendors interviewed by INPUT commented (perhaps surprisingly) that there is no significant Swedish influence in the Norwegian market.

One of the most significant recent developments in the Norwegian software market was the merger (June 1988) of Nordata and Vestdata. The new company will be one of the largest in the country.

There has also been quite a lot of takeover activity involving small Norwegian companies in the past year.

Norwegian users were willing in the past to accept English versions of applications software products but it appears that they are now coming to expect products in Norwegian.

There are very few Norwegian applications software product vendors with activities outside their own country.

## 3. Finland

Finland is the smallest of the Scandinavian markets. Most of the American software companies present in the market operate through distributors.

There is a strong Swedish influence in the Finnish market, particularly for custom-built software.

Vendors interviewed in Scandinavia commented that the Finnish software market is less advanced than in other Scandinavian countries.

## 4. Denmark

The Danish market is similar to those in the other Scandinavian countries—i.e., rather small, with few local companies operating abroad.

One difference is that Denmark is a member of the EEC, and hence will form part of the barrier-free market planned after 1992.

Most of the main Danish-owned applications software companies are essentially professional services companies with some revenues from standard products. Examples include Bording Data and JDC Data. Some smaller companies, such as Data Reforming (whose revenues are



approximately \$2 million), concentrate specifically on applications software products.

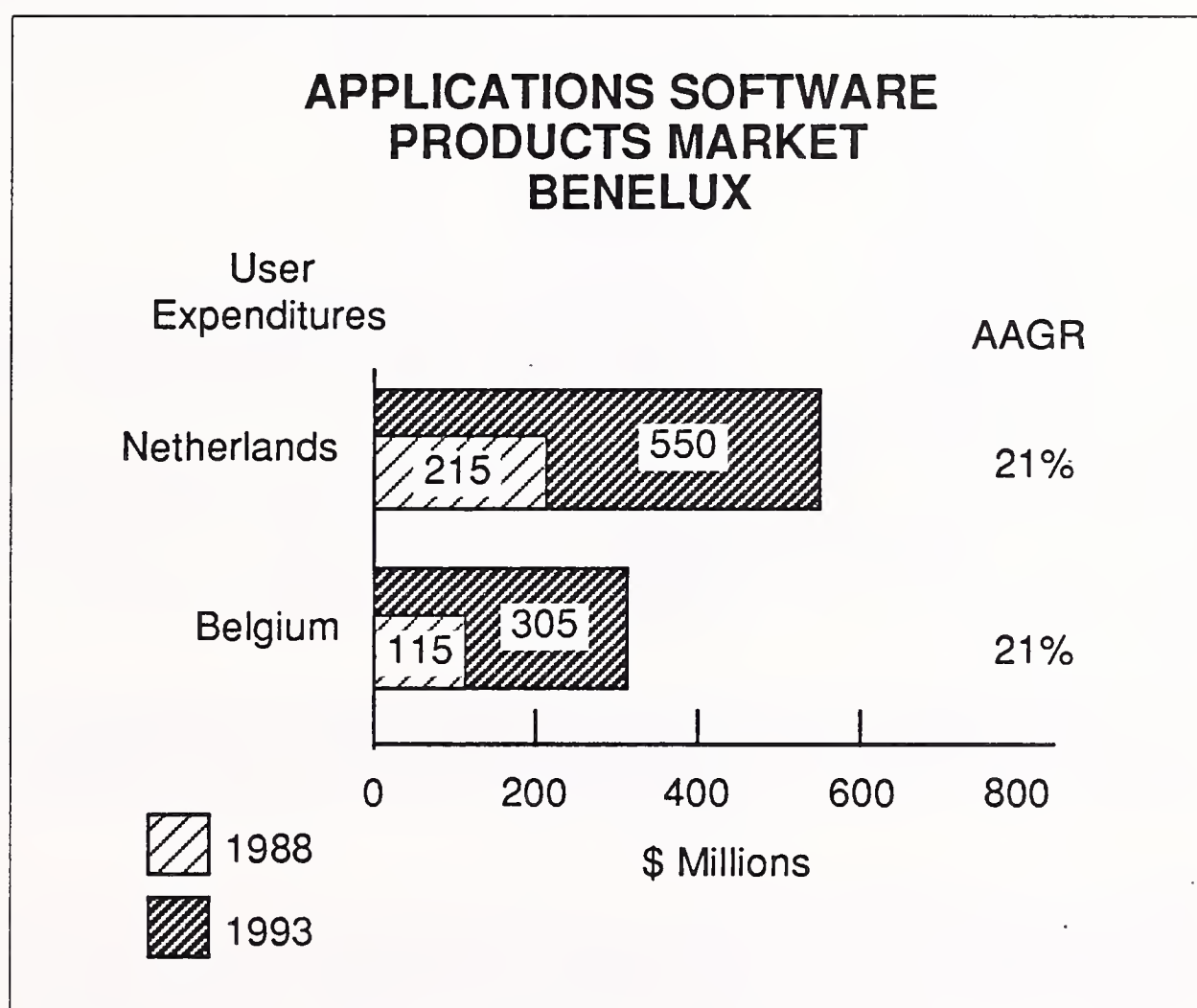
## F

### Benelux

INPUT estimates that the market for applications software products in Benelux (Belgium and Netherlands) was worth \$270 million in 1987. This is expected to increase to \$330 million in 1988, and to grow at an average annual rate of 21%, reaching \$855 million by 1993.

The Benelux market is roughly split Netherlands 65%, Belgium 35%. The relative sizes and growth rates are illustrated in Exhibit V-9.

EXHIBIT V-9



#### 1. Netherlands

The Dutch software market is one of the most internationally open markets in Europe. There is a high concentration of foreign companies operating in the Netherlands, both in the custom software and standard software areas.

In the custom software market, several British companies (e.g., CAP Group and Logica) have strong Dutch subsidiaries. A number of French companies (notably Cap Gemini Sogeti) are also making inroads into the



Dutch market. The two leading custom software companies, however, are Dutch owned. These are Volmac and Raet.

The leading standard applications software product suppliers are foreign companies. In the PC area, Word Perfect is the leading vendor, with Lotus and Microsoft also having significant sales. Some Dutch companies—e.g., Exact and BMS—have smaller shares of the PC market. In the mainframe area also, foreign companies are strongest for standard software products.

English is almost always acceptable in business in the Netherlands. This accounts for the strength of the British and American companies. PC users, however now expect Dutch language versions of application products.

## 2. Belgium

The Belgian software market is very much influenced by French, and to a lesser extent Dutch, companies. Among the most notable ones are Cap Gemini and Steria (France), and Volmac and Raet (Netherlands).

Also, the role of Brussels as an international capital, hosting some significant corporate headquarters, has contributed to the strength of American application software companies. Cullinet, for example, has a significant presence in Belgium.

Among the Belgian companies active in the software products market are Intersys (owned by Papeteries de Belgique) and Dolmen (owned by the Colruyt Group).

## G

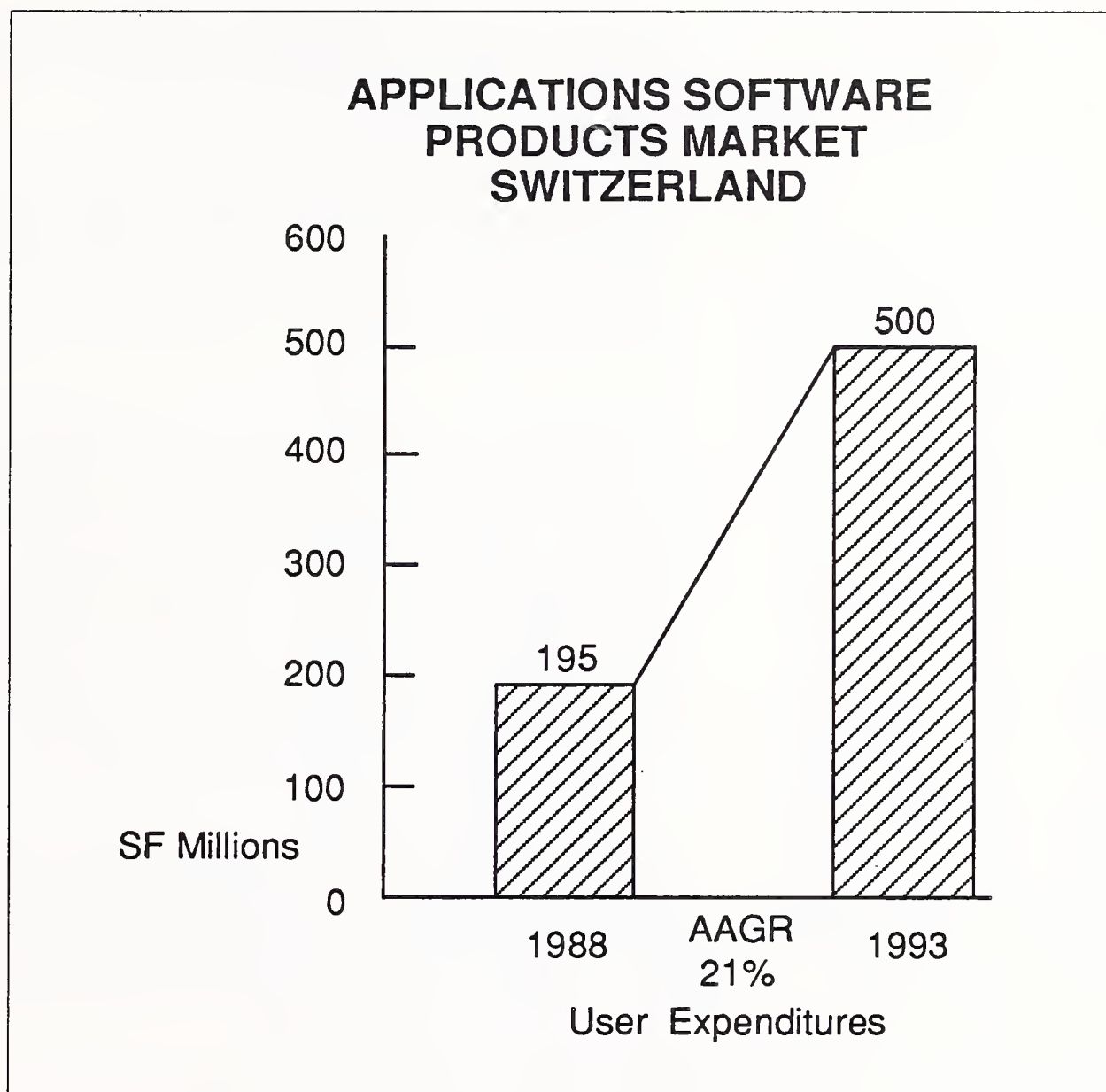
### Switzerland

The Swiss market for applications software products is estimated by INPUT to have been worth SF 160 million in 1987, increasing to SF 195 million in 1988. As shown in Exhibit V-10, it is expected to grow thereafter at an average annual rate of 21%, reaching SF 500 million in 1993.

Switzerland can be divided into three distinct markets, corresponding to the German-, French- and Italian-speaking areas of the country. The relative sizes of these three markets for software products are roughly:

German-speaking	70%
French-speaking	18%
Italian-speaking	12%

EXHIBIT V-10



These three areas need to be approached differently by applications software vendors. They differ not only because of language, but because the mentalities of the people are quite different.

INPUT's discussions with applications software vendors in Switzerland have indicated that the French-speaking area is possibly the most difficult market for outside companies to penetrate. Specific application products can be sold without too much difficulty if there are no directly competing products originating in this area. However, software companies from German-speaking Switzerland find it hard to deal with clients in this region, as there is a preference to work with French-speaking suppliers.

It would appear that the German-speaking area does not present the same problem to outsiders. Customers in this area are more open to software from other sources. One vendor suggested that they are more interested than their French-speaking counterparts in getting the best deal, regardless of who the supplier is. However, it is undoubtedly more advisable

for any company wishing to tackle this market to work from a Zurich base than from the west of the country.

The Italian-speaking area of Switzerland is not such a significant market for applications software vendors. Here the main challenge to face is the provision of software in Italian—a necessary undertaking, but economically justifiable in most cases only if the vendor intends to tackle the market in Italy as well.

Apart from the subdivision of the Swiss market, another inhibitor for software companies is the preference in Switzerland for in-house development. Larger user companies and authorities mainly develop their own applications software. They rarely give projects to software companies, and even then tend to keep full control of the projects. This situation is changing somewhat, however, and there is more of a trend towards standard applications products, following the tendency elsewhere in Europe, and especially in West Germany.

The structure of the Swiss applications software market is highly fragmented. There are many small companies, but few with revenues over SF 10 million, and few companies that export products to other countries. There are a lot of foreign companies (mainly US, German and French) active in Switzerland.

One of the most interesting developments in the Swiss software market in recent years was the fusion of five small software companies into one company, called Industry Software AG (ISAG). These companies came from the three linguistic regions of the country. By coming together, they are aiming to combine their development resources, thereby creating a single company able to satisfy a broader range of demands from clients in all three regions.

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## H

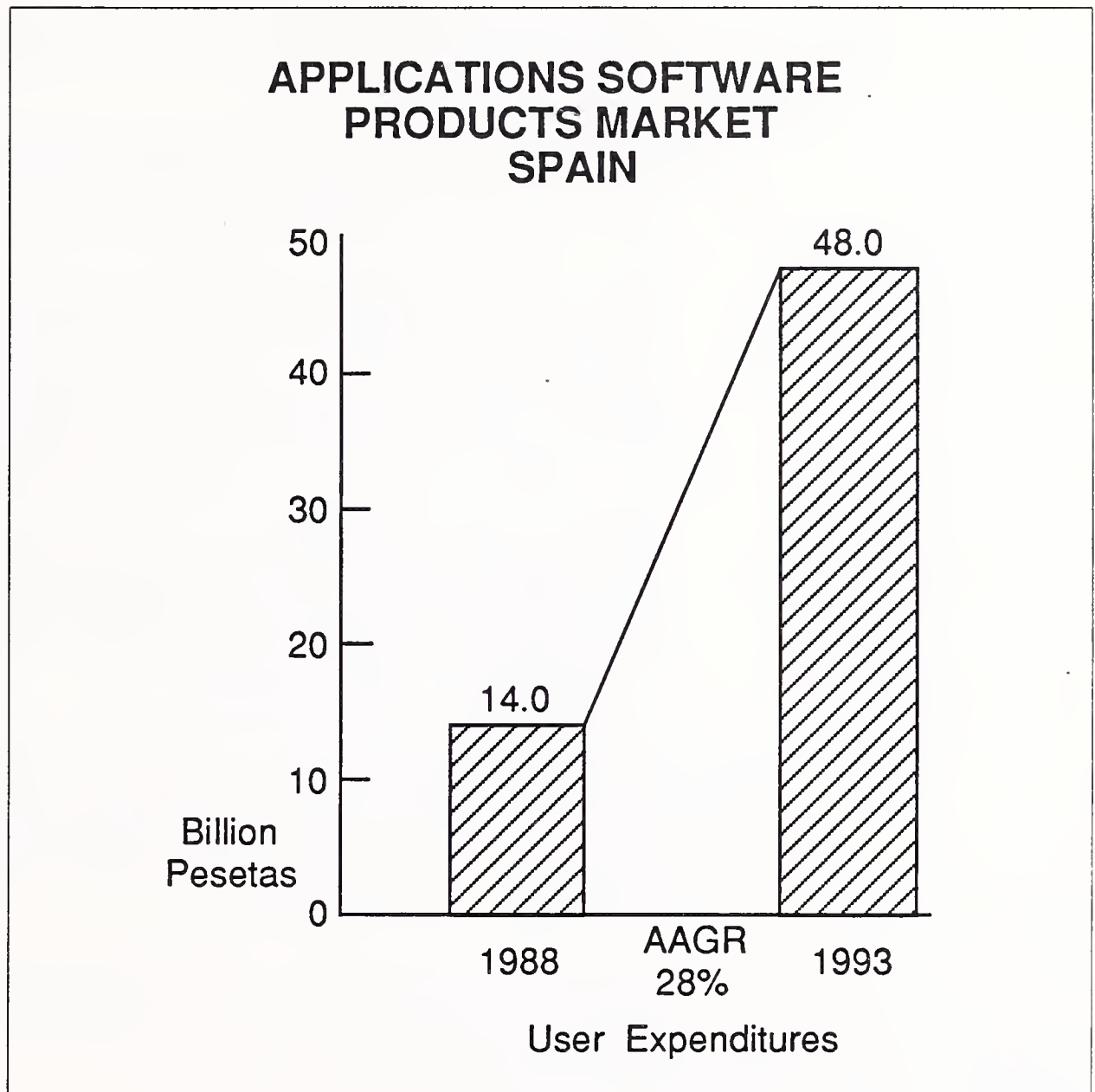
### Spain

INPUT estimates that the Spanish market for applications software products was worth 10.9 billion pesetas in 1987. As illustrated in Exhibit V-11, this market is expected to grow to 14.0 billion pesetas in 1988, and to increase at an average annual rate of 30%, reaching 48.0 billion pesetas in 1993.

This represents the highest growth rate of any country in Europe, and reflects the high growth in the Spanish data processing market in general.



EXHIBIT V-11



Up to the early 1980s, Spain had a very underdeveloped information services market. It then started to grow quite rapidly. Most of the companies operating in the market were set up since 1980.

Spain still lags far behind the other major European countries (France, West Germany, UK, Italy) in terms of level of development and market size, but the gap is closing.

There is a strong influence from French information services companies in Spain. GSI is one of the largest and most long established companies in the market. Sema Metra has strengthened its presence considerably over the past year. Cap Gemini Sogeti and CGI have also become leading players.

Spain has strengthened its links with the other EEC countries since it joined; foreign companies now see there is great potential in the Spanish market. Many American companies (e.g., Cullinet) see Spain as an



important market for the 1990s, and are aiming to establish themselves there.

For language reasons, Spain has strong links with Latin America. Many Spanish software companies are active in this region.

Many Spanish software companies are owned by large groups. This is similar to the situation in Italy. A number of Spanish banks are involved in the industry. Banco de Santander, for example, is the major shareholder in Retesa SA, a young fast-growing software company. Banco de Bilbao only recently sold its interest in GISA to Sema Metra.

INPUT's research shows that a number of users expressed concern at the lack of good applications software in Spanish. It is important for vendors to supply documentation in Spanish. English is not as acceptable as in Northern European countries.

Some users commented on the difficulty in finding technical people to explain the different types of applications software that are available. This indicates that vendors need to create user awareness and provide good support to Spanish users.

One vendor interviewed by INPUT suggested that Spain could potentially be a big UNIX market because it does not yet have a well-established computer industry.

## I

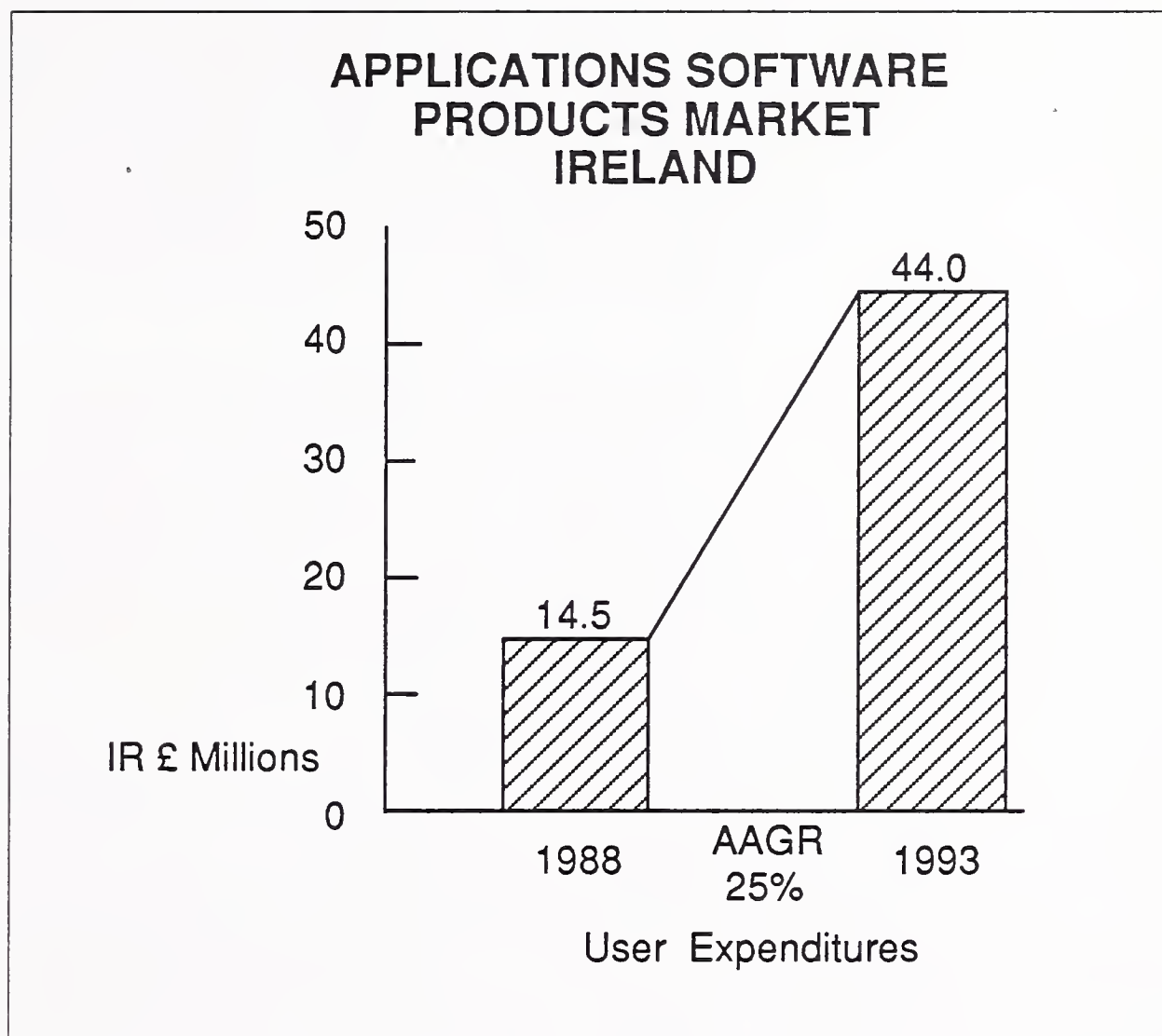
### Ireland

The Irish market for applications software products is estimated by INPUT to have been IR£11.8 million in 1987. As depicted in Exhibit V-12, this market is expected to increase to IR£ 14.5 million in 1988, and to grow at an annual average rate of 25%, reaching IR£ 44 million in 1993.

Despite the small size of the home market, there are several very successful companies developing applications software. Many of these earn their revenues mainly from outside Ireland.

Ireland is considered to be a particularly good base for software companies for a number of reasons. Probably the most important reason is the availability of personnel. There is a high output of computer science graduates from the universities and colleges, and hence companies do not face the same shortages and high turnover of staff experienced in some countries.

EXHIBIT V-12



American companies also favour Ireland for language reasons. Microsoft, for example, has a manufacturing operation in Dublin. MSA bought RTS Limited, a manufacturing and financial software products company also based in Dublin, in 1986. (RTS did not turn out to be a profitable investment, however). Ashton Tate also has an installation in Dublin

The Irish software industry has very close links with the UK. For most Irish companies going into the export market, the UK is the first step. Also a number of British companies are investing in Ireland. Hoskyns, for example, has recently bought a number of small Irish software companies.

Another interesting example of a foreign company investing in Ireland is the German company DOS GmbH. DOS produces a large proportion of its commercial applications software products in Dublin, although its markets are mainly in German-speaking countries.

Three of Ireland's most successful software companies are the Kindle Group, Dillon Technology and Software Laboratories.

The Kindle Group sells banking applications software for ICL hardware. Only 3 or 4 percent of its revenues come from the Irish market. About one-third of the remainder comes from the UK, and the rest from outside of Europe (Africa, Far East, America). Despite Kindle's wide geographic coverage, it can provide most of its support by phone from its base in Dublin. This is possible because its products are standard worldwide.

Dillon Technology develops multicurrency financial software. It aims at the high end of the accountancy software market, for multinational companies. The company has a subsidiary in the UK and distributors in Kuwait and Bahrain. Dillion is presently looking for acquisitions in the UK, France, Germany and Italy. It recently supplied the software for the new duty-free shop at Moscow airport.

Software Laboratories began development of its range of UNIX accounting software in 1981, in the expectation that Unix would become an established operating system. It was not until more than five years later that the company's first products were launched on the market. The second half of 1987 proved to be extremely successful, with the signing of a contract with NEC in Australia worth £17 million and a contract worth £15 million over 5 years for distribution in the UK and France. Software Laboratories, whose products are available in several languages, received initial funding from the Irish Government.

The National Software Centre was set up by the Irish Industrial Development Authority in 1983. The centre was planned as an infrastructural facility to increase the pace of development of the Irish software industry and to exploit the potential for growth in international markets. It provided technical and commercial support for small Irish software companies. Most of its exporting support was aimed at the UK, but it also focused on the Netherlands, Germany and the Scandinavian countries.

The National Software Centre seemed to be providing (or aiming to provide) a very useful service to Irish software companies before the sudden announcement in May 1988 that it would close because its revenues and funding arrangements would not sustain operations.



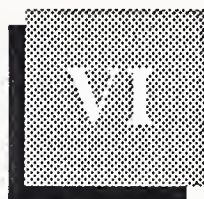


# Application Areas









## Application Areas

### A

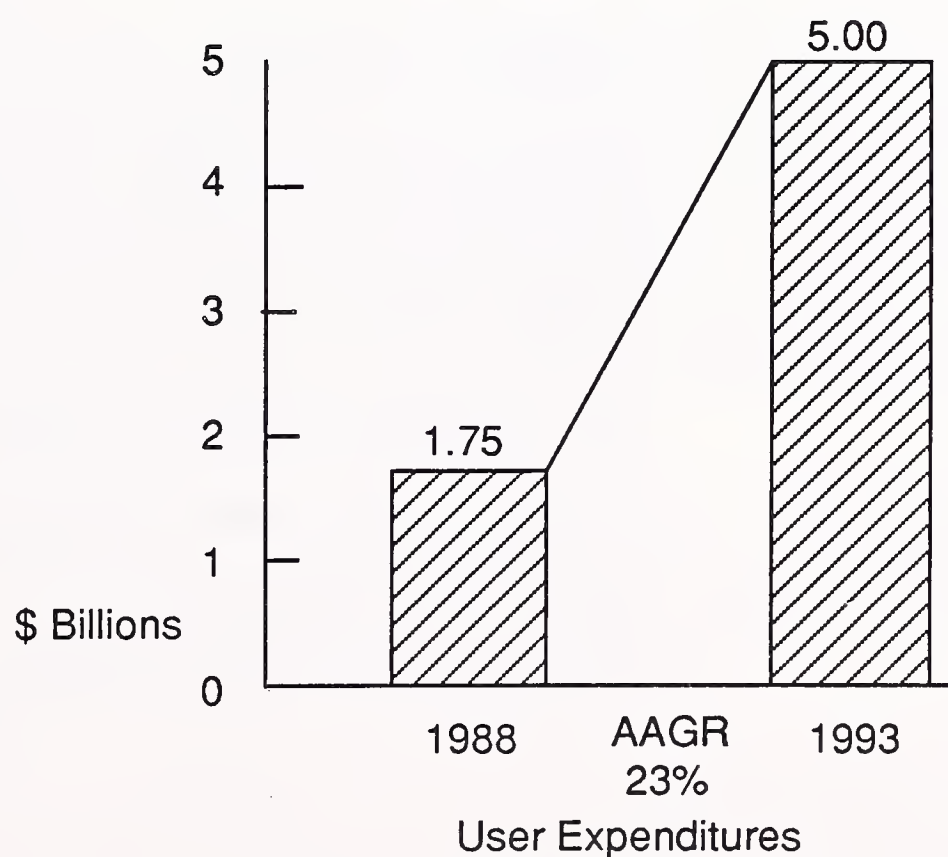
#### Industry-Specific Applications

##### 1. Overview

Exhibit VI-1 shows the size and growth of the market for industry-specific applications software products for the period 1988 to 1993.

EXHIBIT VI-1

#### INDUSTRY-SPECIFIC APPLICATIONS SOFTWARE PRODUCTS, 1988–1993



The average annual growth rate of 23% is higher than that for cross-industry applications, reflecting an important tendency in the marketplace.

The vertical industry approach consists in many cases of semistandard solutions using reusable core components (kernels). This approach is being taken more and more in banking, manufacturing, insurance and distribution, for example.

The hardware manufacturers are now focusing very much on vertical markets. IBM is reorganising its sales force into one composed of industry specialists focusing on 13 specific areas. This new organisation resembles the approach being used by Digital in the U.S. and Europe.

From the user point of view, it makes good financial sense to use standard products where possible for vertical applications. In some areas (e.g., banking), however, users claim that they can only gain a competitive edge by using custom software that other companies do not have.

Three of the most important industry sectors—Banking and Finance, Manufacturing, and Distribution—are discussed in some detail in the following sections.

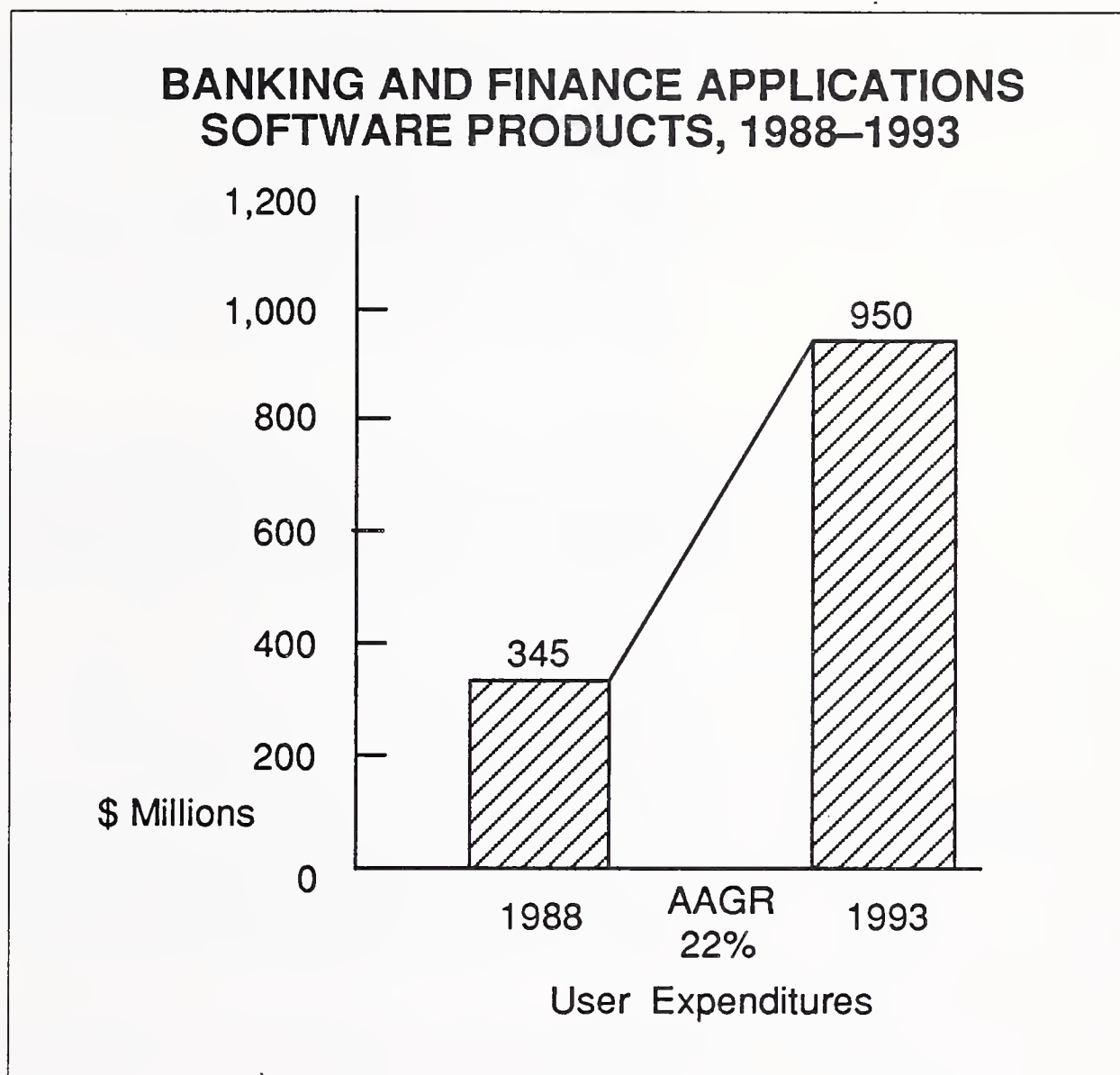
## **2. Major Industries**

### **a. Banking and Finance**

Banking and financial institutions spend a very high proportion of their expenditures on electronic data processing—approximately 15%. INPUT estimates that the expenditure on information services by the Banking and Finance segment in 1987 in Europe was \$6.5 billion.

About half of this sector's information services expenditures are on processing services. However, applications software products also claim a large share of this market. INPUT estimates that the user expenditure on applications software products in the Banking and Finance sector in Europe in 1987 was \$280 million. As shown in Exhibit VI-2, this market is expected to increase to \$345 million in 1988 and to grow at an annual average rate of 22%, to reach \$950 million by 1993.

EXHIBIT VI-2



In an increasingly competitive environment, banks are obliged to improve administrative procedures and increase their control over costs and hence profitability. Furthermore, they are shifting the emphasis of their data processing from mass processing of transactions to the provision of new advanced products and services, such as credit/debit cards, EFTPOS, home banking etc. In the consumer-oriented, deregulated climate that characterises the financial world, the potential benefits of more and better software have become more attractive.

The development of banking applications software was once largely the domain of the banks themselves. Over the years a number of third-party banking software companies, particularly in the IBM arena, have sprung up, providing alternatives for financial institutions.

A number of leading financial institutions have teamed with some of the key applications software suppliers in joint development efforts. Several of these agreements have taken place in the U.S., one of the most significant in 1987 being Cullinet's arrangement with American Express Bank



Ltd. to develop a version of Cullinet's Banking System for the international market. Another American company, Hogan Systems Inc., signed a joint agreement with Midland Bank in the U.K. in April 1987 to write banking software. This deal, which was worth about \$10 million, involved Hogan's supplying its entire product line to Midland as well as jointly developing an integrated programme for the bank. However, this ambitious project came to an end in November 1987 when Midland decided to halt the joint development.

European software companies are also closely involved in deals with banks. This is particularly common in France, where a number of large software and service companies are owned by banks. (Sligos is owned by Credit Lyonnais and SG2 by Societe Generale, for example.)

In most cases, these software houses began life as the data processing subsidiaries of the banks. They then expanded their scope and worked for other customers. A consequence of these relationships is that outside suppliers sometimes find it difficult to get business from these banks. It also highlights a characteristic of banking DP operations—i.e., that the banks do not like to give total control of a project to an external software house, but prefer to keep control themselves.

In many cases, the software developed jointly by banks and software houses can later be marketed as a standard product. Cullinet will, for example, hold the rights for the programme it develops with American Express, and is expected to release a product in 1989. This highlights a potential area of opportunity for software companies considering developing products for the Banking and Finance sector, but this strategy can be equally applicable in other sectors.

There are few financial software companies that cover the whole European Market. Most companies, like Saari in France and ESI in Italy, for example, tend to confine themselves to their own country markets. A few, like the Irish company, Dillon Technology, have successfully tackled the international financial market by providing software for multinational organisations.

Although there is a definite trend towards standard applications software for the banking and finance sector, the demand for custom software for certain applications is expected to remain strong, as banks and other financial institutions strive for competitive advantage by providing services that are not offered by their competitors.

Several vendors interviewed by INPUT commented that the stock market crash in October, 1987 has had little impact on lessening the demand for software for financial applications.

Exhibit VI-3 summarises the ratings given by users in the banking and finance sector on the importance of a list of criteria related to applications

EXHIBIT VI-3

### USERS' RATINGS OF THE IMPORTANCE OF APPLICATIONS SOFTWARE CRITERIA— BANKING AND FINANCE SECTOR

ISSUE NO.	ISSUE	AVERAGE RATING		
		Gen. Mgmt.	DP Mgmt.	Overall
1	Vendor Financial Strength/Track Record	7.06	7.05	7.1
2	Vendor Knowledge of User Industry	6.83	7.77	7.3
3	Vendor Knowledge of Specific Applications	7.22	7.95	7.6
4	Documentation	8.50	8.86	8.7
5	Ease of Use	8.67	9.09	8.9
6	Training	8.22	7.86	8.0
7	Ongoing Application Support	8.06	8.38	8.2
8	On-Site Maintenance	8.61	7.38	8.0
9	Remote Diagnostics/Off-Site Maintenance	8.89	7.32	8.1
10	Price	7.61	6.45	7.0
11	Ease of Modification	8.17	7.67	7.9
12	Availability of Source Code	8.17	7.81	8.0

Sample Size = 45.

software products. (The overall results of the user research are given in Chapter VII.)

The exhibit shows that ease of use and documentation are the main priorities. This ranking corresponds to the overall situation (for all users). The most notable deviation from the overall user rating is the very high priority given by general management to remote diagnostics/off-site maintenance. Price is the least important criterion; it receives a particularly low rating from DP managers.

Exhibit VI-4 illustrates the main problems reported by users in the banking and finance sector with applications software products. Most concern was expressed about poor features or performance and about the quality of documentation.

EXHIBIT VI-4

**MAJOR PROBLEMS ENCOUNTERED  
BY USERS WITH APPLICATIONS  
SOFTWARE PRODUCTS—  
BANKING AND FINANCE SECTOR**

PROBLEM	NUMBER OF MENTIONS		
	General Mgmt.	DP Mgmt.	Total
Poor Features/Performance	6	7	13
Poor Documentation	3	7	10
Difficult to Use	3	2	5
Maintenance	2	2	4
Poor Training	1	1	2

Sample Size = 45.

**b. Manufacturing**

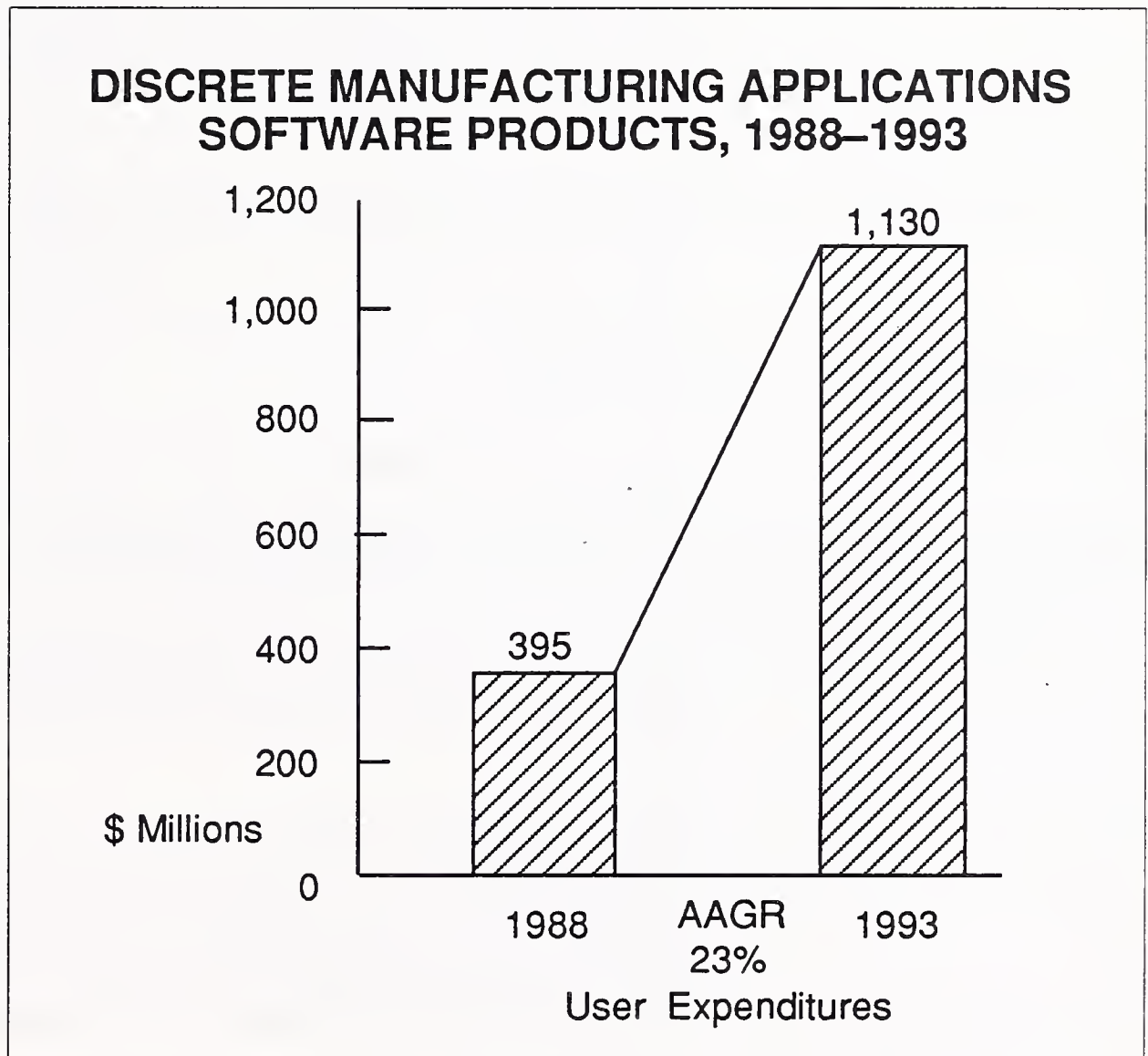
INPUT subdivides the manufacturing sector into two subsectors—discrete manufacturing and process manufacturing. The two are quite different in their information services requirements. Discrete manufac-



turing has a much larger demand for applications software. Hence this section will apply particularly to the discrete manufacturing sector.

With reference to Exhibit VI-5, INPUT estimates that user expenditures on vertical applications software products in the discrete manufacturing sector in 1988 will be approximately \$395 million. This spending is expected to increase annually at 23%, reaching \$1,130 million in 1993.

EXHIBIT VI-5



Manufacturing industry has come to see automation as essential for survival. For applications software vendors, this sector is, and will continue to be, a very important one.

One noticeable trend over the past few years has been the increase in investment in mini-based systems. Most large manufacturers have already invested in mainframe systems. Hence the higher end of the market is more mature. Also, many smaller companies cannot afford the massive cost and DP overhead of a mainframe and thus growth in this end of the market is more limited.



This cost factor is also forcing some manufacturing companies to take a short-term view of the cost benefits of automation. Some companies are looking for a return on investment within a short period, rather than recognising that the benefits may not be realised immediately.

The stress on compatibility is important. Many manufacturing companies introduced computer systems piecemeal to reduce the risk of experiment and to cut costs. The result was the creation of "islands of automation" where stock control systems could not interfere with orders, and output from CAD systems had to be redrawn before the engineering department could use them.

Most suppliers are now advocating integrated systems that embrace every stage of the manufacturing life cycle. In addition, manufacturing applications are linked to other nonmanufacturing ones, such as distribution, ledger, etc. Hence the danger to users of considering manufacturing in isolation.

Applications software for computer-integrated manufacturing (CIM) is rarely standard. The requirements of each user are different. Hence most of the software for such applications is customised.

The use of kernels for CIM applications is common. The users' specific needs can be satisfied in many cases by adapting a semistandard product. The software can be parameterised to provide the flexibility required.

Although parameters make the software more flexible, they also require the user to take on more responsibility than when the software is totally standard. The user must therefore be more qualified to work on such adaptation. It also means that the software vendor must be able to provide a lot of help in the adaptation and implementation of the application.

INPUT therefore recommends that applications software vendors who wish to supply products for manufacturing industry examine the possibility of adopting the kernel approach. This would appear to be the best way of making multiple sales in a very diversified industry.

The high importance placed on automation by the manufacturing industry is reflected in the number of large manufacturing groups that have bought or taken a stake in software houses.

The most significant of these developments was the acquisition of EDS by General Motors in 1986. In the past year, this trend has been evident

in Europe, particularly in West Germany, Europe's major manufacturing nation. In 1987, the Thyssen Steel group bought a one-third share of IKOSS. BMW took a minority share in Softlab and will increase this share to 100% in the future. Other large German manufacturers that own software houses are: Daimler Benz (AEG/GEI), Hoesch (MBP) and Krupp (Krupp Atlas Datensysteme). These relationships provide these industry giants with their own "think factories" that can supply the expertise needed to satisfy their automation needs.

INPUT's discussions with companies providing software for manufacturing applications have revealed a generally optimistic outlook. Manufacturing companies see the need for automation for competitive advantage. They realise that many processes can be automated. Falling hardware prices are also now convincing more people that automation is financially possible.

Exhibit VI-6 summarises the priorities of users in the manufacturing sector regarding applications software products. (The overall user research is analysed in Chapter VII.)

The exhibit illustrates that ease of use and documentation are considered to be the most important criteria. This corresponds to the overall user response. General management placed particular importance on documentation.

## EXHIBIT VI-6

**USERS' RATINGS OF THE IMPORTANCE OF  
APPLICATIONS SOFTWARE CRITERIA—  
MANUFACTURING SECTOR  
(DISCRETE AND PROCESS)**

ISSUE NO.	ISSUE	AVERAGE RATING		
		Gen. Mgmt.	DP Mgmt.	Overall
1	Vendor Financial Strength/Track Record	6.11	6.42	6.3
2	Vendor Knowledge of User Industry	6.48	7.27	6.9
3	Vendor Knowledge of Specific Applications	7.56	7.77	7.7
4	Documentation	9.04	8.42	8.7
5	Ease of Use	8.81	9.04	8.9
6	Training	8.00	8.19	8.1
7	Ongoing Application Support	8.30	8.73	8.5
8	On-Site Maintenance	8.11	8.04	8.1
9	Remote Diagnostics/Off-Site Maintenance	7.48	7.31	7.4
10	Price	6.96	7.15	7.1
11	Ease of Modification	8.22	7.96	8.1
12	Availability of Source Code	6.74	7.27	7.0

Sample Size = 56.



Exhibit VI-7 shows that the main problem encountered by users in the manufacturing sector is documentation. This is particularly significant given the importance placed on documentation, as shown by Exhibit VI-6.

EXHIBIT VI-7

**MAJOR PROBLEMS ENCOUNTERED  
BY USERS WITH APPLICATIONS  
SOFTWARE PRODUCTS—  
MANUFACTURING SECTOR  
(DISCRETE AND PROCESS)**

PROBLEM	NUMBER OF MENTIONS		
	General Mgmt.	DP Mgmt.	Total
Poor Documentation	6	9	15
Poor Features/Performance	6	8	14
Difficult to Use	7	2	9
Maintenance	2	4	6
Poor Training	2	4	6

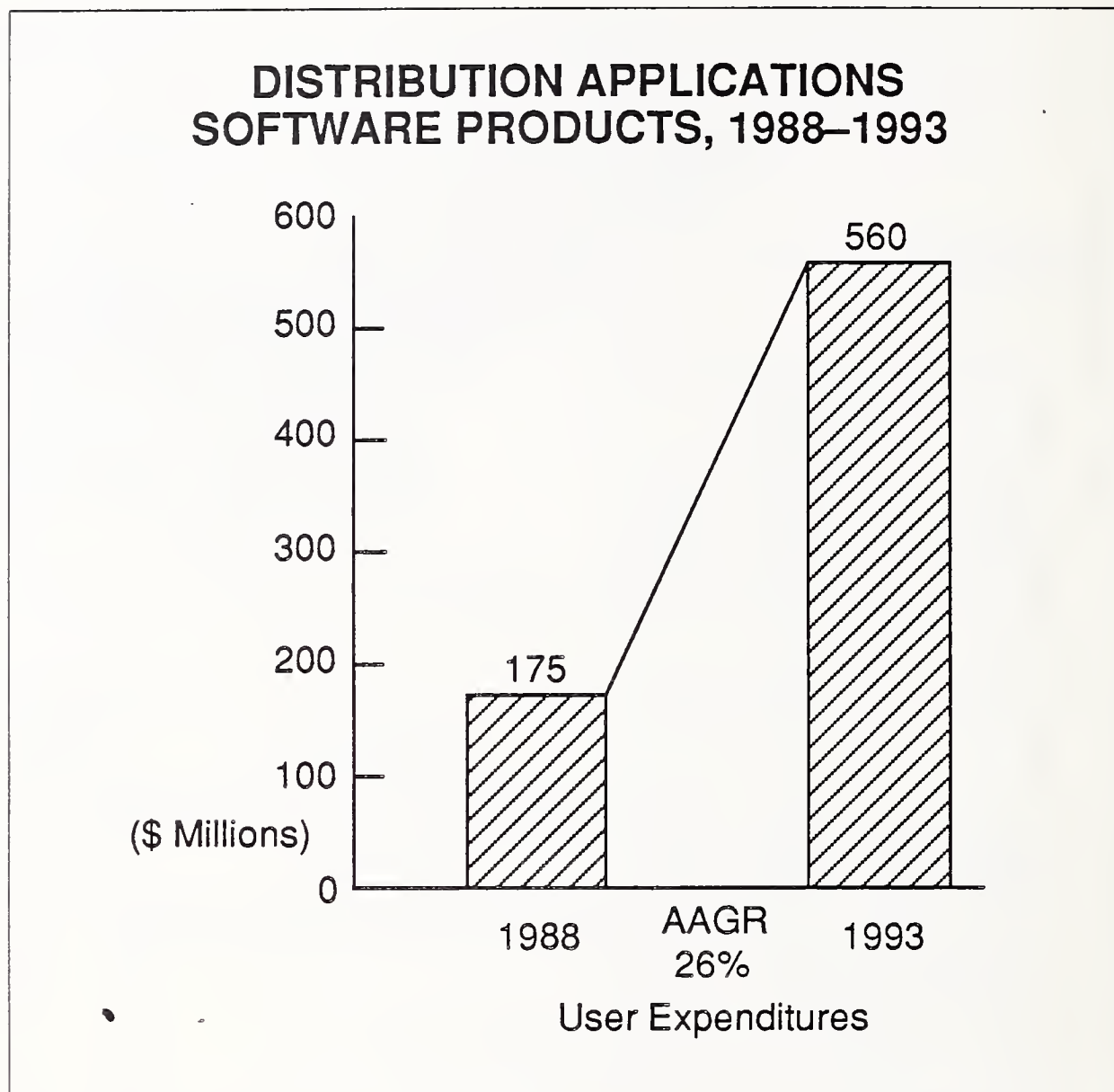
Sample Size = 56.

**c. Distribution**

The distribution sector (including both wholesale and retail) is one that is growing rapidly for applications software vendors. INPUT estimates that user expenditure in Europe in 1987 was \$ 140 million. As shown in Exhibit VI-8, this market is expected to increase to \$175 million by 1988, and to grow at an annual average rate of 26%, to reach \$560 million by 1993.



EXHIBIT VI-8



There has been an explosion in the number of distribution software products on the market. It is estimated that, in the U.K., there are now over 300 packages available, and over 400 in France.

This growth reflects the pressure to improve service and cut costs. (Distribution accounts typically for up to 20% of the total cost of a finished product.)

One of the most important distribution applications at present is warehouse management. What is important for these types of systems is to provide information on the position of stock; the actual position itself is not so important.

Warehouse management was mentioned recently by The Institute of Logistics and Distribution Management in a survey of physical distribution software as one of the areas most likely to benefit from computerisation. The other areas included in their list were:

- Automated storage and retrieval
- Stock control
- Vehicle scheduling
- Customer order processing
- Demand forecasting
- Inventory planning
- Distribution network planning

The shift in the nature of the retail trade has also had a major effect. Out-of-town sites; the growth of major companies by merger, take over and expansion; and changes in the nature of product display and sale have all brought a new strategic nature to the business. Retailers can now allocate shelf space by reference to consumer demand, optimum fill patterns and product performance criteria.

In general, the retail trade is less computerised than the wholesale trade. However, there has been a huge increase in the number of software products available for retailers in the past few years. The approach of vendors has been mainly to develop specific packages for different types of retail outlets rather than general retailer products.

Smaller retailers are not yet used to the idea of using computers. More than in most industries, there is a conflict between computerisation and the "culture" of a typical retailer. This is reflected in the relative immaturity of this market. Nevertheless, the appearance of new technologies, such as bar coding, introduces the retailers to the concept of computerisation, and requires them to adapt in order to remain competitive. To accompany this evolution, vendors need to inform retailers of the existence of a new generation of specific software packages that correspond to their requirements.

Exhibit VI-9 shows the ratings given by users in the distribution sector on the importance of a list of criteria related to applications software products. (The overall user research is analysed in Chapter VII.)

Ease of use is clearly the main priority. It is interesting that documentation receives a relatively low rating of 7.5, making it the fifth most important criterion on the list (compared to second for all users). Ease of modification and the availability of source code are also well below the overall user levels.

## EXHIBIT VI-9

**USERS' RATINGS OF THE IMPORTANCE OF  
APPLICATIONS SOFTWARE CRITERIA—  
DISTRIBUTION SECTOR  
(RETAIL AND WHOLESALE)**

ISSUE NO.	ISSUE	AVERAGE RATING		
		Gen. Mgmt.	DP Mgmt.	Overall
1	Vendor Financial Strength/Track Record	5.94	7.24	6.6
2	Vendor Knowledge of User Industry	7.35	6.62	7.0
3	Vendor Knowledge of Specific Applications	6.71	7.81	7.3
4	Documentation	6.94	8.05	7.5
5	Ease of Use	9.24	8.52	8.9
6	Training	8.06	7.48	7.8
7	Ongoing Application Support	8.53	7.90	8.2
8	On-Site Maintenance	7.88	7.71	7.8
9	Remote Diagnostics/Off-Site Maintenance	7.82	6.90	7.4
10	Price	6.88	6.81	6.8
11	Ease of Modification	6.35	8.10	7.2
12	Availability of Source Code	5.59	6.95	6.3

Sample Size = 40

As shown by Exhibit VI-10, the main problem encountered by users of applications software products in the distribution sector was poor features or performance. This reflects the overall user research (see Chapter VII).

EXHIBIT VI-10

**MAJOR PROBLEMS ENCOUNTERED  
BY USERS WITH APPLICATIONS  
SOFTWARE PRODUCTS—  
DISTRIBUTION SECTOR  
(RETAIL AND WHOLESALE)**

PROBLEM	NUMBER OF MENTIONS		
	General Mgmt.	DP Mgmt.	Total
Poor Features/Performance	5	8	13
Poor Documentation	4	6	10
Difficult to Use	4	3	7
Poor Training	0	4	4
Maintenance	2	1	3

Sample Size = 40

**d. Others**

Two of the other major industry sectors, Government and Insurance, are briefly discussed below.

*i. Government*

Government departments in European countries tend to develop software in-house for most applications (apart from common cross-industry ones).



There have, however, been some indications that government bodies are now looking more seriously at packaged software. This is being brought about partly by difficulties in recruiting enough in-house programming personnel.

The U.K. Inland Revenue, for example, recently indicated that it is to increasingly rely on packaged software following the failure of a £16.5 million (\$28 million) computerisation plan.

## *ii. Insurance*

The market for insurance software products in Europe is estimated by INPUT to be worth \$140 million in 1988. Expected annual growth until 1993 is approximately 25%. By this time the market will have reached \$425 million.

As mentioned earlier, in the section on software house-client partnerships, the American software supplier Continuum has, together with a number of large U.S. insurance companies, spent about seven years and £30 million (\$51 million) developing a package for insurance companies. The package, called CCA, is expected to be used by most of the big U.K. insurance companies when it is available in its finished version sometime in late 1988. The cost to customers will be between £600,000 (\$1 million) and £2.2 million (\$3.7 million).

## **B**

### **Cross-Industry Applications**

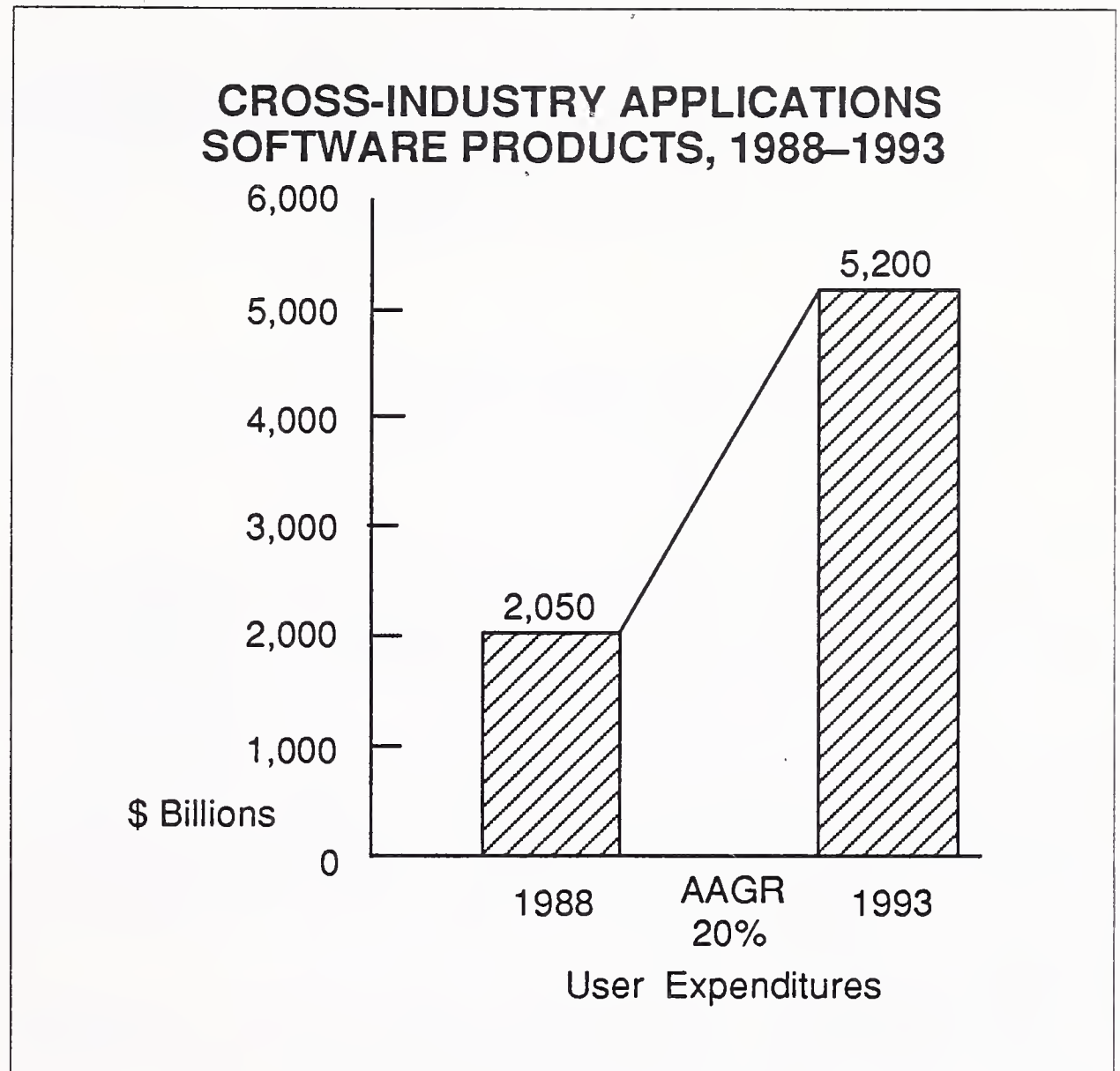
#### **1. Overall**

Exhibit VI-11 shows the market size and growth of the market for cross-industry applications software products for the period 1988 to 1993.

The growth rate of 20% is slower relative to the entire applications software products market. This is due largely to the extent that cross-industry applications have already been installed. Since cross-industry applications are essentially generic in nature, there are no extensive barriers to their acceptance and their ability to solve meaningful problems. For example, word processing, spreadsheets, human resources, project management applications and accounting were "natural" applications to use.

The most important cross-industry applications (in terms of market size) are discussed in the following sections.

EXHIBIT VI-11



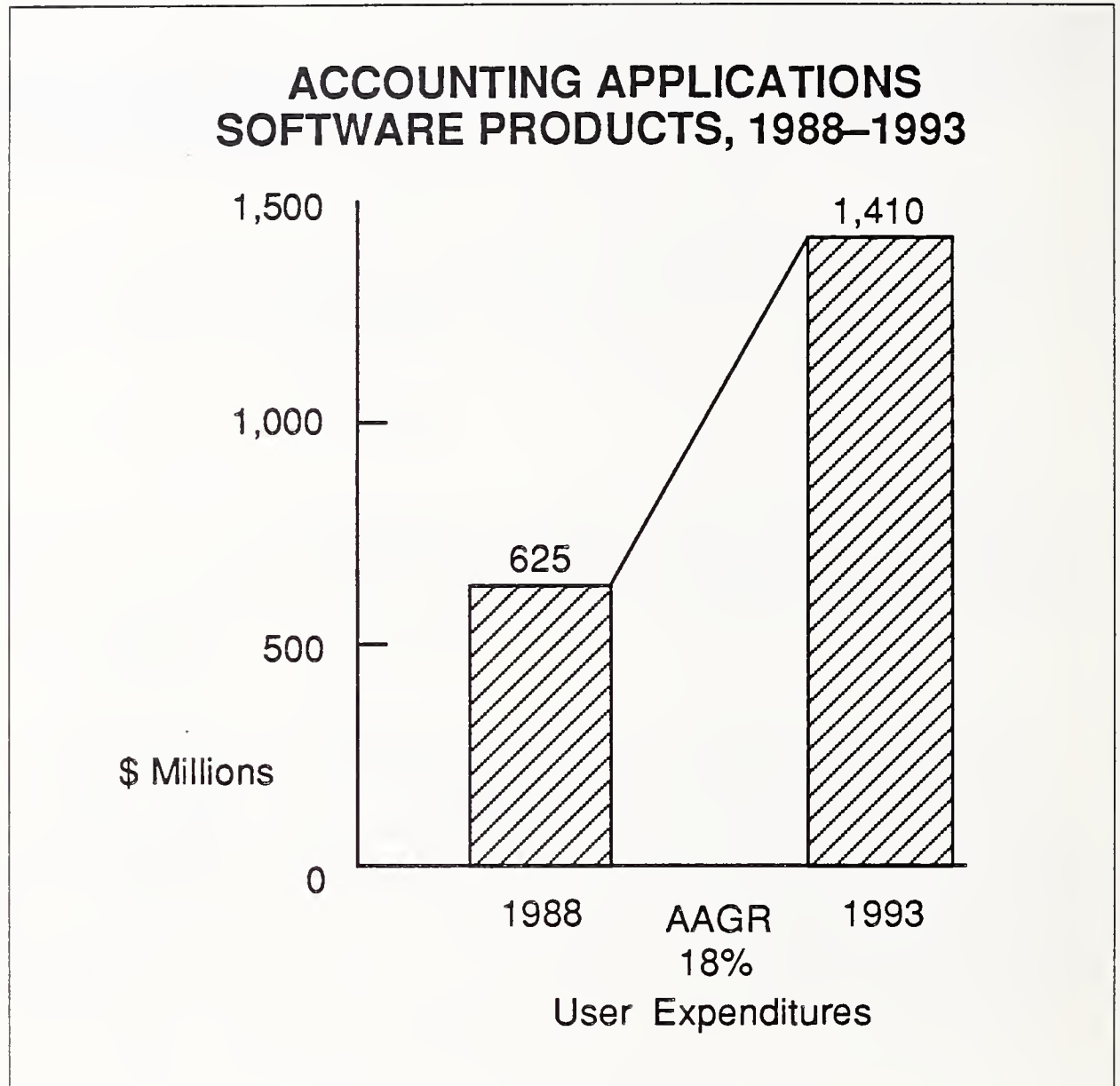
## 2. Major Cross-Industry Applications

### a. Accounting

Accounting software is one of the most important cross-industry application areas. INPUT estimates that the market for accounting packages in Europe in 1987 was \$520 million. As shown in Exhibit VI-12, this market is expected to increase to \$625 million in 1988, and to grow annually at 18%, reaching \$1,410 million in 1993.

Possibly the most significant change in accounting software in the past five years has been the shift to real-time systems from batch systems. General ledger, accounts receivable, and accounts payable have all evolved from batch transaction processing systems to on-line, real-time systems.

EXHIBIT VI-12



This development is driven by the fact that many other “input” systems are real-time, and thus users have become accustomed to, and thus expect, real-time benefits and features in all systems. With input systems, such as material requirements planning (MRP) systems, being real-time, the effect of transactions (e.g., inventory transactions) can be updated immediately in the general ledger. Thus, the accountants and other personnel are accessing and using the same data at all times.

Another major change that has occurred is the move from financial accounting-oriented software to software that not only satisfies financial accounting needs, but also management accounting and management reporting needs. Clients now want fully integrated systems from a single source.

Accounting systems have evolved in many cases from merely transaction-processing systems to systems with “what-if” capabilities that support cash budget projections and so on.



Many software vendors have remarked on a change in the users of accounting systems—the users are now tending to be more involved in the operation of these systems. These users (accountants) are willing to take responsibility for the selection, purchase and operation of software products. They want to be able to operate their system and produce various types of output without relying on information-systems personnel.

Users now require more-flexible systems. Flexibility in applications software has been improved by the use of tables and option parameters, and through increased use of fourth-generation language capabilities.

Another big change has been the more widespread use of personal computers. Mainframe accounting systems now have PC links that allow downloading to spreadsheet packages, off-line input of transactions, and upload of data that has been developed on PCs, such as budgets.

The trend towards greater use of PCs as workstations will continue into the future. It is likely, however, that until the reliability problems inherent to distributed data processing are solved, most accounting data will continue to be stored and processed centrally on mainframes.

The trend towards the integration of applications will continue. Some vendors feel that there will be an overlap between applications—for example, between general ledger and accounts payable. Certainly tighter integration between MRP systems and accounting systems is likely to occur.

The international market for accounting software has the problem of different accounting bases, in addition to the language problem. It is likely that more worldwide systems will be developed that follow the generally accepted accounting principles of many different countries and that work in any language. The companies with a competitive head start in this area are those that have provided software to multinational corporations. These companies (very often U.S. software firms) will have dealt with many of the international issues. The whole area of “enterprise-wide” computing is now receiving much attention, as companies are looking for “global solutions” to their needs.

Given the increase in the processing power of minicomputers, and the trend towards departmental systems, it is expected that a major growth area for accountancy applications software will be in the minicomputer area.



There is very strong competition in Europe between accountancy software vendors, with hundreds of companies offering packages. In general, the only companies that have a reasonably strong presence across all of Europe are the American vendors, such as McCormack & Dodge and MSA. In each country, there are numerous local companies that produce packages mainly for the home market.

In France, for example, several large software houses—such as GSI, SPI, CGI Informatique and CDF Informatique—offer accountancy packages, but they consider it too difficult to penetrate markets outside France, since there are too many native products in each country.

One competitive development expected by some people is the increasing involvement of the “Big Eight” accounting firms in the applications software market, particularly for accounting applications (for example, Arthur Andersen). The management consulting divisions of these firms could become significant competitors with application software firms in two ways. First, they may decide to develop and market their own accounting software. Second, when a “Big Eight” firm works hand in hand with a particular application software company, this combination becomes a significant competitor to the other application software companies.

## **b. Human Resources**

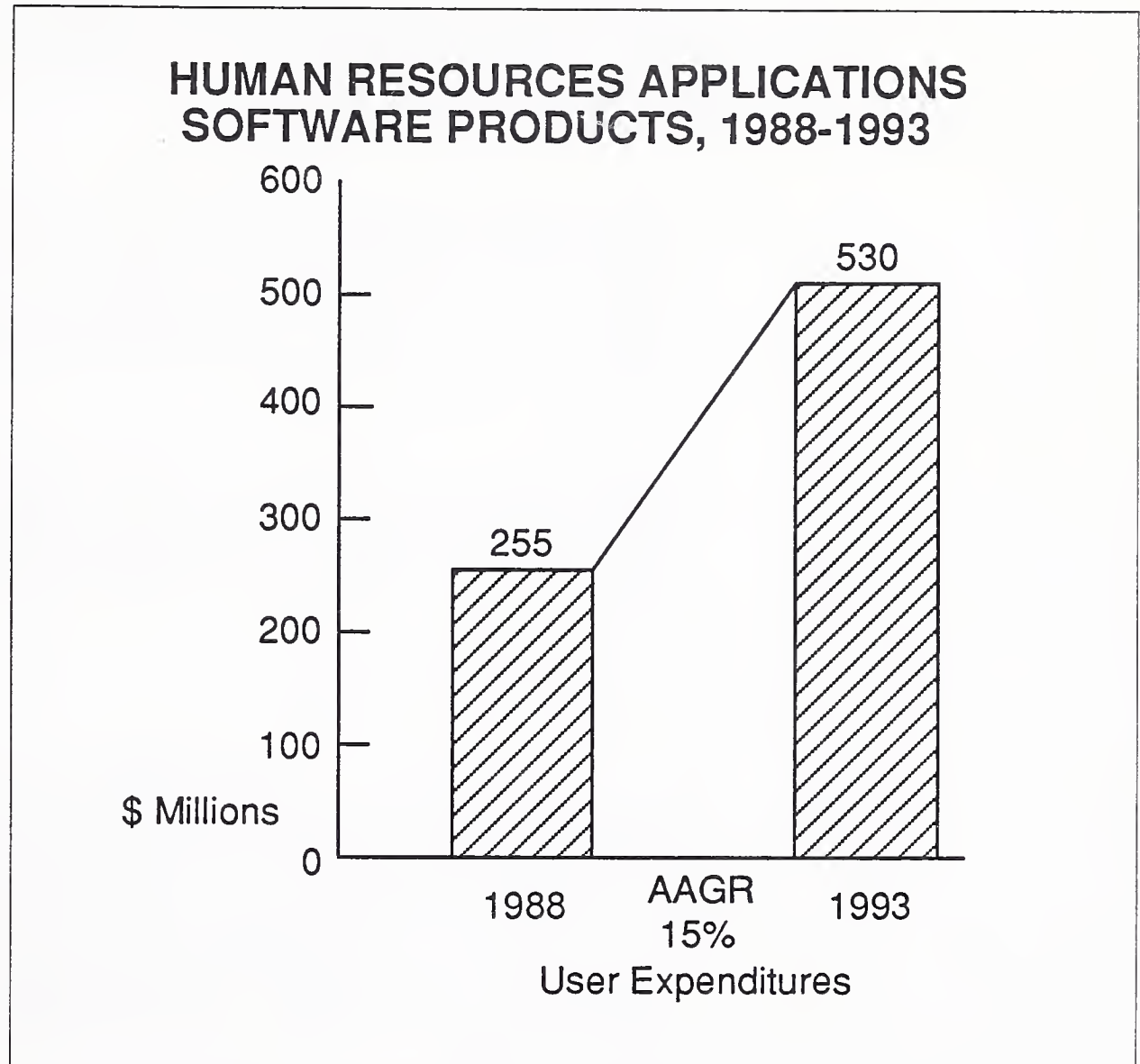
Investment in computerised personnel management systems has increased significantly over the past few years.

INPUT estimates that the market for human resources applications software in Europe in 1987 was \$220 million. This market is forecast to grow to \$255 million in 1988, and to increase at an average annual rate of 15%, reaching \$530 million by 1993. This projection is illustrated in Exhibit VI-13.

For human resources applications, more than most others, the increasing use of microcomputers and software packages has had a significant impact. It has meant that for the first time a personnel department could buy its own system from its own budget. Before that, personnel tended to be low in the priority list for the data processing department.

The trend towards using smaller computers for personnel applications is true for big companies as well as smaller ones. Some large companies are decentralising, and are now using minicomputers to run personnel systems.

EXHIBIT VI-13



One of the main applications in the human resources area is payroll. Many of the payroll systems being used today still run on outdated technology, often batch/Cobol programmes. There are also many new payroll packages on the market. These packages offer users one major advantage over in-house programmes: users do not have to update the software themselves to keep up with changes in tax and social security laws.

The frequency with which tax laws are being changed (especially in the U.K.) has a number of implications for vendors. It means that very often they are being faced with updates that need to be completed within a short period. This urgency has led to a new lease of life for many of the old computer bureaux. This alternative also saves the users from having to go through the loading and testing of updates.

The U.K. government's regulation changes have proved such a problem that most payroll packages have failed the National Computer Centre's evaluation. This does not mean that the packages cannot be sold, as most

of the faults are minor. But it does indicate the complicated nature of the tax and National Insurance system, and the consequent difficulties facing payroll software developers.

The American company MSA recently abandoned its IPP human resource package and handed it over to its rival, Peterborough Software. This leaves Peterborough with a virtual monopoly of this sector of the IBM mainframe market, with 40% of all people in the U.K. being paid through its software.

Peterborough also recently announced an integrated payroll, personnel and pensions package that incorporates a 4GL, enabling personnel staff to write their own applications without the need for programming expertise.

### **c. Planning and Analysis**

The main subsegment of the Planning and Analysis segment is spreadsheet packages. Two other important areas are decision support systems and project management. INPUT estimates that the market for Planning and Analysis software packages in Europe was worth \$480 million in 1987. As shown in Exhibit VI-14, this market is expected to increase to \$565 million in 1988, and to grow annually at 17%, reaching \$1,230 million in 1993.

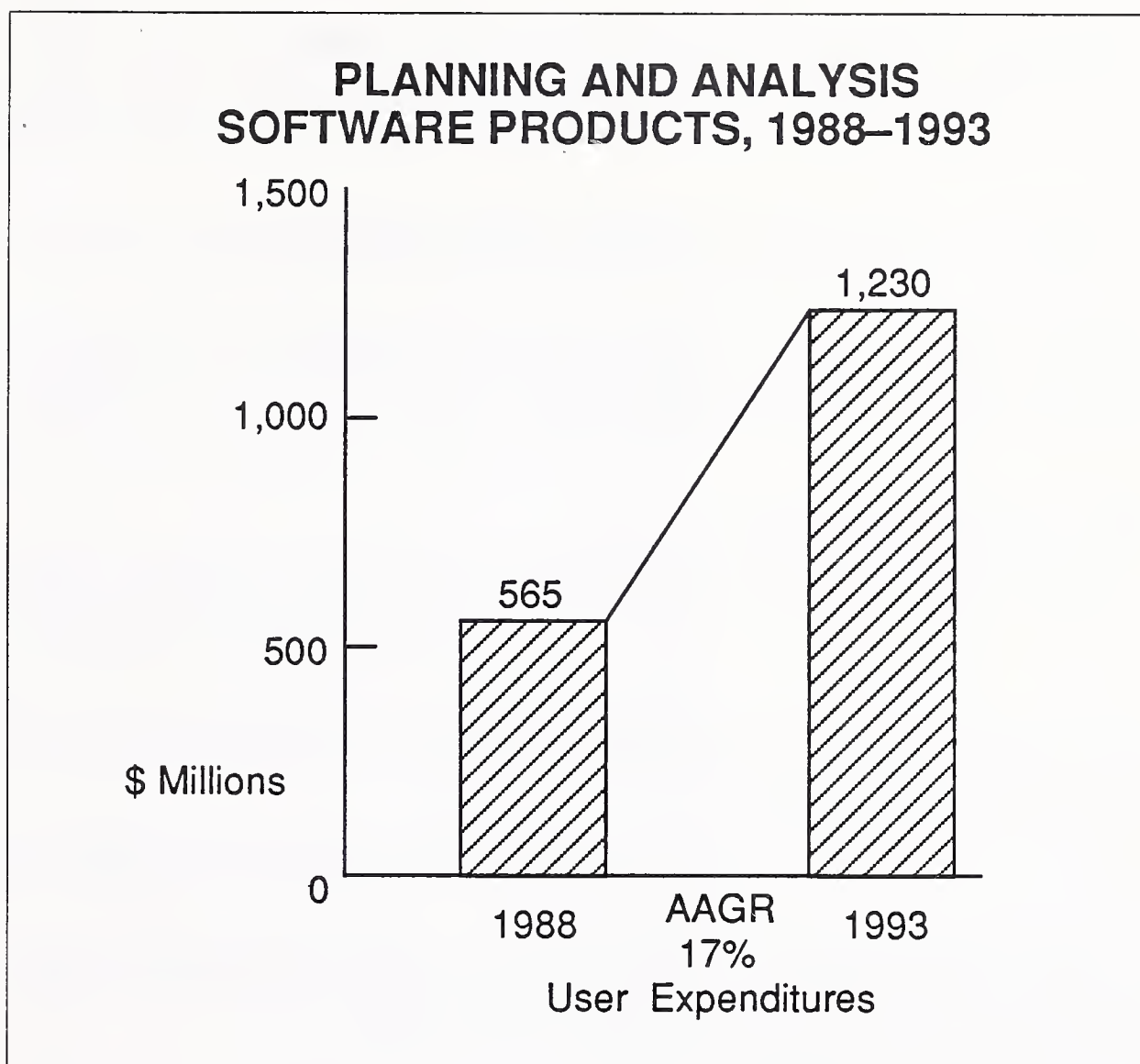
Spreadsheet packages are among the most widely used software in business. This area has been dominated by Lotus 1-2-3 virtually since its release in 1983. Other big sellers have included Microsoft's Multiplan and Excel, and Computer Associates' Supercalc.

Despite the relative saturation of the spreadsheet market, new developments in hardware and operating systems are contributing to an increase in spreadsheet creativity. More-powerful hardware, specifically Intel's 80386-based machines and IBM's PS2, has opened up functional possibilities.

Microsoft's Windows environment is currently inspiring developers. It is expected that the Microsoft and IBM implementation of OS2 will have a significant impact, as will the Presentation Manager, which will provide a direct upgrade path from Windows. New operating systems will enable programmers to create larger, faster, more feature-laden spreadsheets that address more memory than before.



EXHIBIT VI-14



The factors contributing to the growth of user expenditures for spreadsheets include:

- Templates, add-ons, custom consulting services and other services for 1-2-3 that will extend its life.
- New developments in hardware and operating systems that will improve functional possibilities.
- The ability of “clone” vendors to sell to users who desire their own copies of a spreadsheet rather than being forced to “share” a copy of 1-2-3.
- Micro-mainframe links that increase the usefulness of PC-based spreadsheets.
- New users who will be attracted by the HAL natural language interface.

The factors that negatively affect user expenditures for spreadsheets include:



- Saturation in the market.
- Downward pricing pressures from low-priced clones.
- Increased sales of all-in-one integrated software that reduces the need to buy a separate spreadsheet.

These negative influences will have quite a strong impact, the net result being that the growth rate for spreadsheet packages over the next few years is expected to be relatively low, which has a major impact on the overall growth rate for planning and analysis software in general.

The market for spreadsheet packages is obviously one that cannot be easily penetrated by new entrants, given the dominance of a few well-known products. In addition to having a very good product, it would be necessary to invest considerable resources in marketing and advertising, in order to make the product known to the huge potential user base.

It will be difficult for new vendors to gain significant market share from Lotus, even if they have “better” products. 1-2-3 is almost the industry standard product. The additional functionality offered by other products is not normally needed. According to Lotus, 1-2-3 is very much under-utilised at the moment.

Another subsegment of the planning and analysis segment is project management software.

The mainframe project management market is dominated by a few American-owned companies, notably Metier, PSDI, IBM (with its AS product) and AGS (distributor in U.K.—L.A. Computer Services).

The PC area is more competitive, with over 150 products in the U.K. This market is growing faster than the mainframe project management area.

#### **d. Others**

The remaining cross-industry application areas are all smaller in size but growing faster than the three already discussed.

The main component of the engineering and scientific market is computer-aided engineering/design/manufacturing (CAE/CAD/CAM)—i.e., when classified as cross-industry applications.

This market is expected to grow at around 28% annually for the period 1988 to 1993. An increasingly significant proportion of software for this sector will be used on workstations.

Education and training applications are also expected to grow quickly over the next five years, as an increasing number of workers come into contact with computers in their work. (Note that cross-industry education and training, as defined by INPUT, includes applications in all industries, but does not include "vertical" software sold to educational institutions.)

The major "Other Cross-Industry" application is word processing. This market is quite mature, however, and growth is low. The overall growth rate is increased substantially by the fast-moving graphics and desktop publishing application areas.

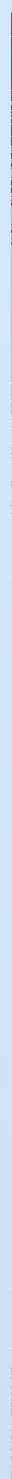
The market for graphics software is being driven by its increasing use by business managers. As more managers become accustomed to using graphics for financial reporting or sales and marketing applications and presentations, the market will continue to grow.

Desktop publishing software expenditures are growing at a high rate. Apple dominated this area in the past, but shipments from other vendors are increasing. The growth of the desktop publishing market will negatively impact the word processing and graphics software markets.



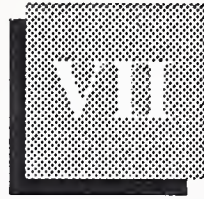


# User Issues









## User Issues

### A

#### Introduction

As part of INPUT's research for this study, 100 senior data processing professionals and 103 middle/departmental managers (spread across marketing, production, finance, personnel and administration) were interviewed by telephone. An analysis of the research sample is given as Appendix B.

The purpose of this survey was to obtain information on the extent to which standard applications software packages are used, for which applications, and the problems that users have encountered with them. The survey also sought to get users' views on the relative importance of various criteria related to applications software. Their views on custom software and standard turnkey systems were requested. Users were also asked to outline their future plans for application development, to give their views on what products should be available on the market, and to describe the decision process in their organisations regarding the purchase of applications software.

The questionnaire used for this research is included as Appendix C.

### B

#### Usage of Standard vs. Custom Software

##### 1. Standard Applications Software

Exhibit VII-1 shows the extent to which standard applications software products are used in companies, and the main application areas reported by users.

## EXHIBIT VII-1

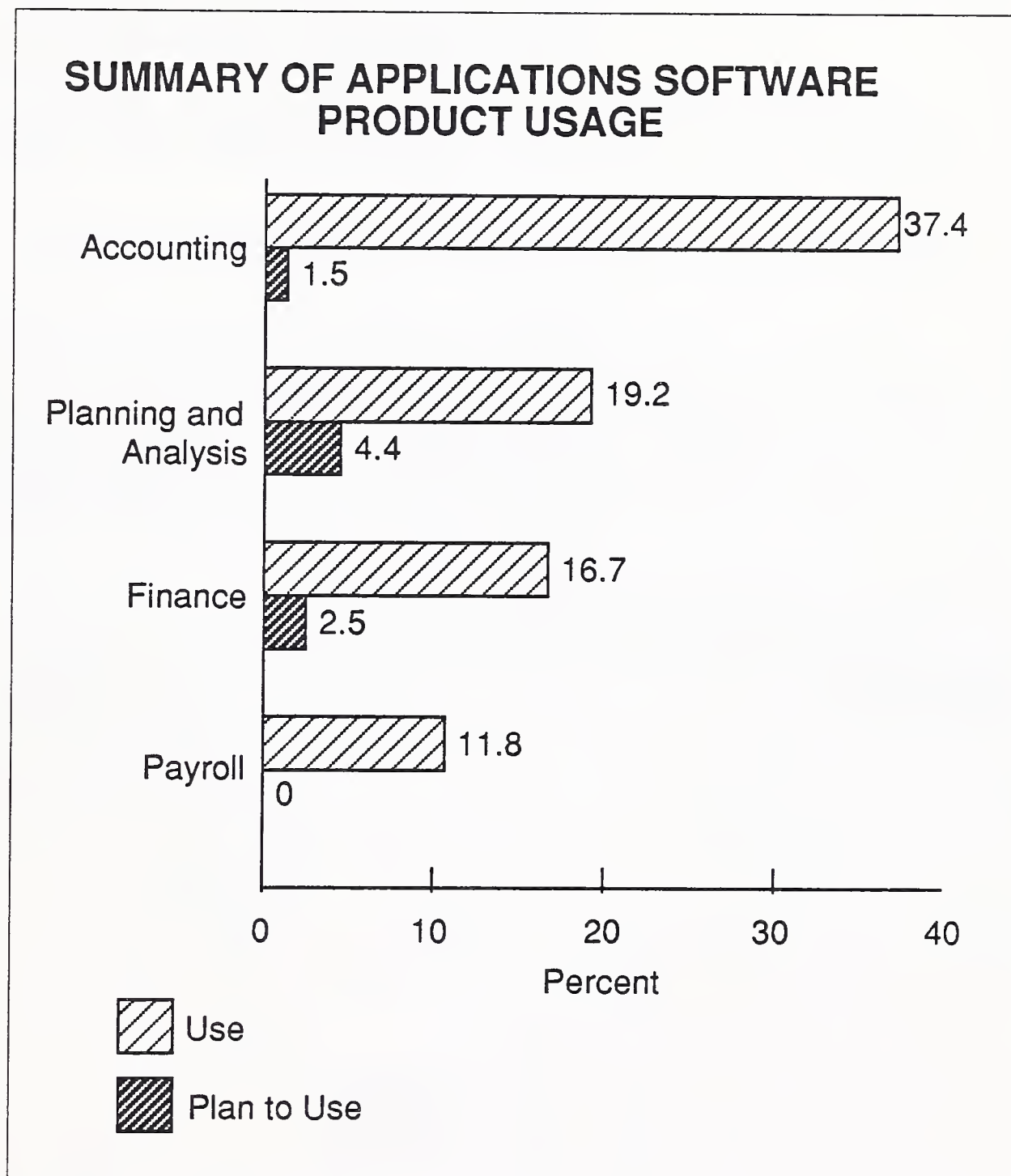
**USAGE OF APPLICATIONS SOFTWARE PRODUCTS**

APPLICATION TYPE	NUMBER OF RESPONDENTS					
	USE			PLAN TO USE		
	Gen. Mgmt.	DP Mgmt.	Total	Gen. Mgmt.	DP Mgmt.	Total
Accounting	31	45	76	0	3	3
Planning and Analysis	22	17	39	3	6	9
Finance	20	14	34	0	5	5
Payroll	11	13	24	0	0	0
Administration	11	6	17	0	2	2
Personnel	5	11	16	1	0	1
Sales/Distribution	13	3	16	4	1	5
Stock Control	5	9	14	0	4	4
Office Automation/ Communication	2	10	12	0	0	0
Production Control	0	10	10	0	3	3
Technical	1	6	7	0	1	1
Education/Training	1	4	5	0	3	3
Other Cross-Industry	10	3	13	0	1	1
Industry-Specific	11	10	21	1	1	2

Note: Number of respondents = 203

Exhibit VII-2 illustrates graphically the main applications featured in Exhibit VII-1.

EXHIBIT VII-2



These exhibits show that by far the most common application for standard packages is accounting. It should be pointed out that some of the departmental managers interviewed would not be aware of the software packages used outside their own departments, and hence market penetration is probably greater than these exhibits would suggest. However, they do give an indication of the relative usage of these packages.



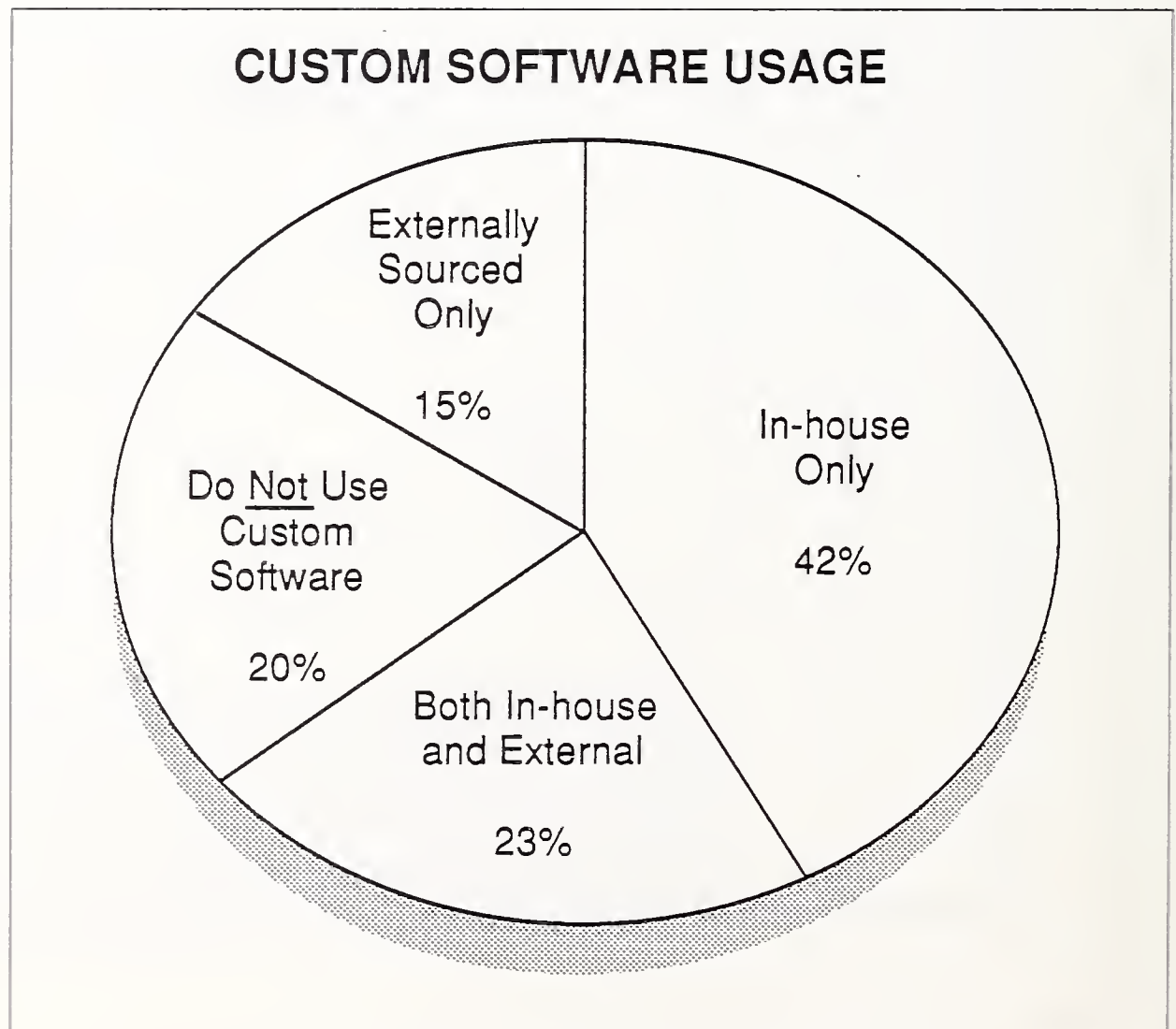
Planning and analysis (including spreadsheets), finance, personnel/administration and payroll were some of the other areas that were mentioned frequently by users.

It is worth noting that the main applications mentioned are cross-industry. Some of the applications listed (e.g., production control and technical) are partly industry-specific. The "industry-specific" category covers a range of applications, each receiving one or two mentions.

## 2. Custom-Built Applications Software

Exhibit VII-3 shows the extent to which user organisations use custom-developed applications software, and the source of this software for this sample. The vast majority of the users (80%) interviewed by INPUT use custom software. For about 40% of the companies, all of this software is developed in-house. Only 15% obtain this software uniquely from external sources. The remaining 23% use both in-house and externally sourced custom software.

EXHIBIT VII-3



The types of applications for which users reported using custom-developed software are listed in Exhibit VII-4. Again accountancy applications are at the top of the list, reflecting the extent to which accounts are computerised in business (or users' awareness of computerisation). The related area of finance is also high on the list.

A significant number of respondents mentioned management applications. This is followed by several (mainly cross-industry) applications.

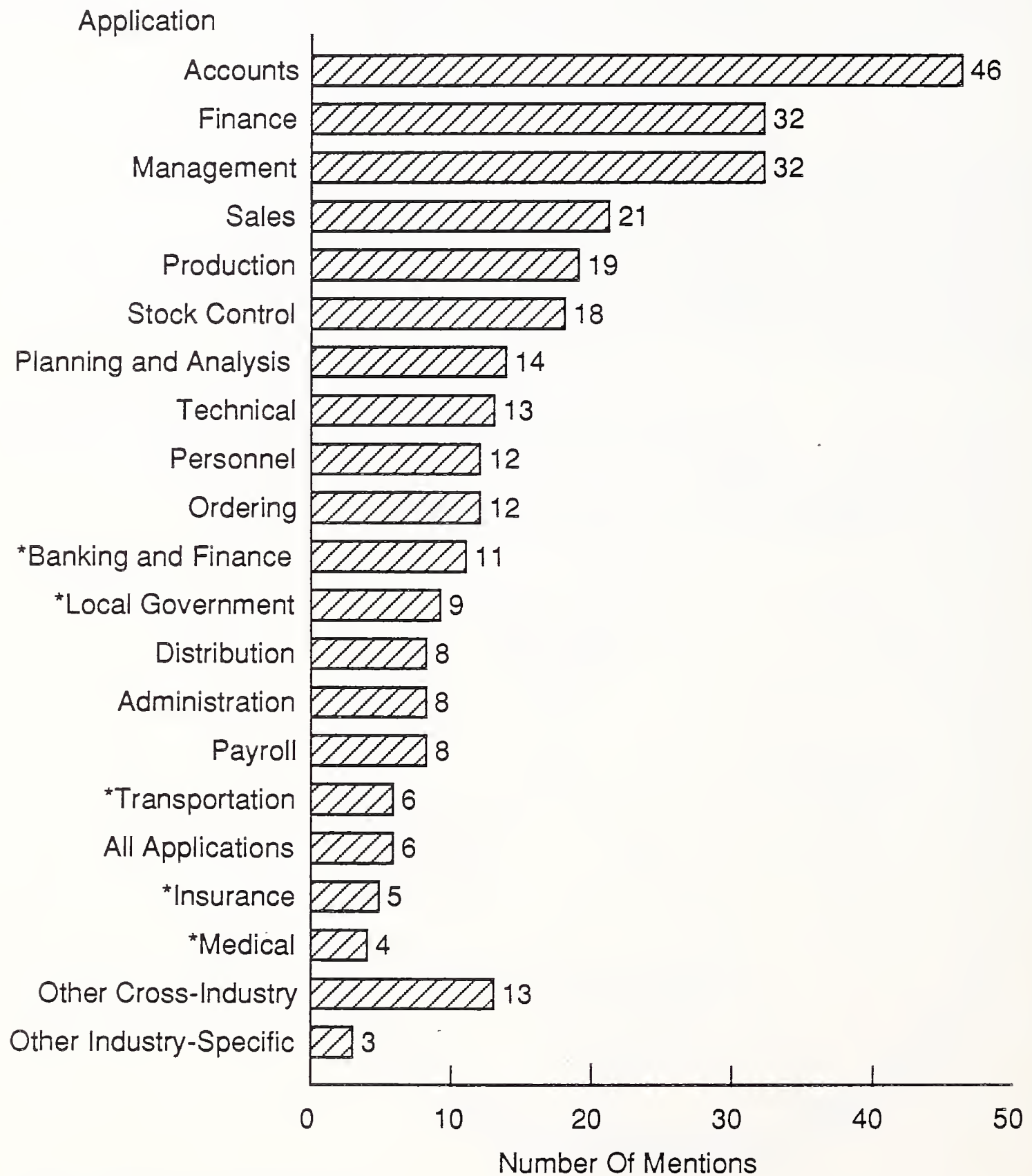
It is interesting to note that two vertical industry sectors—banking and finance, and local government—feature quite prominently in this list.

In the case of banking and finance, INPUT's research indicates that custom software is used widely, not only because there are no suitable standard products available, but also because the organisations involved believe they can gain competitive advantage by having a system that others do not have.

In the case of local government, it would appear that there is a shortage of standard products to satisfy the specific needs of individual local bodies.

EXHIBIT VII-4

### CUSTOM APPLICATIONS SOFTWARE— MOST COMMON APPLICATIONS AS REPORTED BY USERS



\*Vertical Industry Applications  
Total Sample = 203

Exhibit VII-5 lists some of the reasons given by users for not using standard software products for certain applications. The first reason (nonavailability of standard software for users' specific needs) is the most obvious and common type of response. Most of the other answers were each given by one respondent only. Where it is thought relevant, the nationality and type of the respondent's organisation is given.



## EXHIBIT VII-5

**USERS' COMMENTS ON THEIR REASONS FOR NOT USING  
STANDARD APPLICATIONS SOFTWARE PRODUCTS**

There is nothing available for our specific needs.

We have to make changes that cost time and money.

The software needs to be industry specific. (- Dutch chemicals company)

The end user is more satisfied with the flexibility of an internally developed application.

We need closer control so we end up with exactly what we need.

There is a need for interaction and feedback.

The standard software that is available is too complicated. (- French wholesale distribution company)

We use custom software because all other banks can buy standard products. (- Dutch bank)

It would be too expensive to use standard products due to the new French software copyright law.  
(- French Technology Institute)

We need compatibility with the rest of the group.

There is no programme on the market for bookkeeping of stocks and shares. (German stockbroker)

It is difficult to adapt standard products to the specific environment of our hospital. (- Italian hospital)

The data system must not break down—our cash card stations must never shut or run out of money.  
(- Swedish information services company)

For certain production applications, every company is different, so standard software is no good.  
(- German discrete manufacturing company)

Software producers concentrate mostly on markets for towns of 50,000 to 250,000; there is nothing  
for cities of 1 million. (- German local government body)

The software must fit Norwegian banking laws and work practices. (- Norwegian bank)

We change software to suit our needs rather than change the organisation to suit the software.  
(- Danish wholesale distribution company)

For the manufacture of furniture there are no special programmes available.  
(German manufacturing company)

We need compatibility with our existing system, which is not very well known.

We have used the same system for 10 to 15 years, and cannot find any suitable programmes for it.

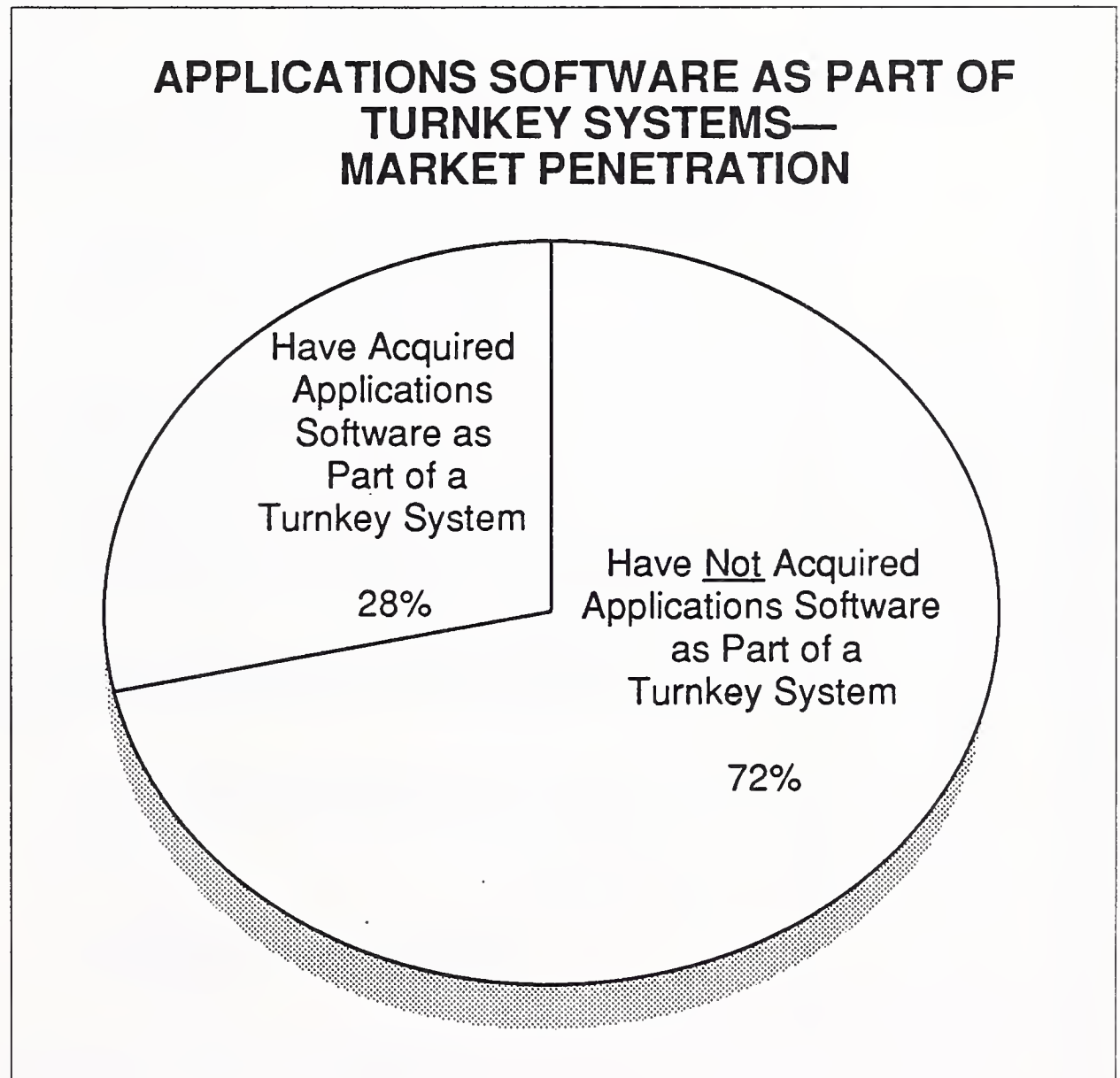
## C

Applications Software  
in Turnkey Solutions

Users' attitudes regarding applications software acquired as part of a standard turnkey system (an integration of software with hardware, packaged as a single entity) are illustrated in Exhibits VII-6 through VII-8.

Exhibit VII-6 shows the percentage of users that use or have used applications software in such a system. Of those interviewed, 28% had acquired applications software in this way.

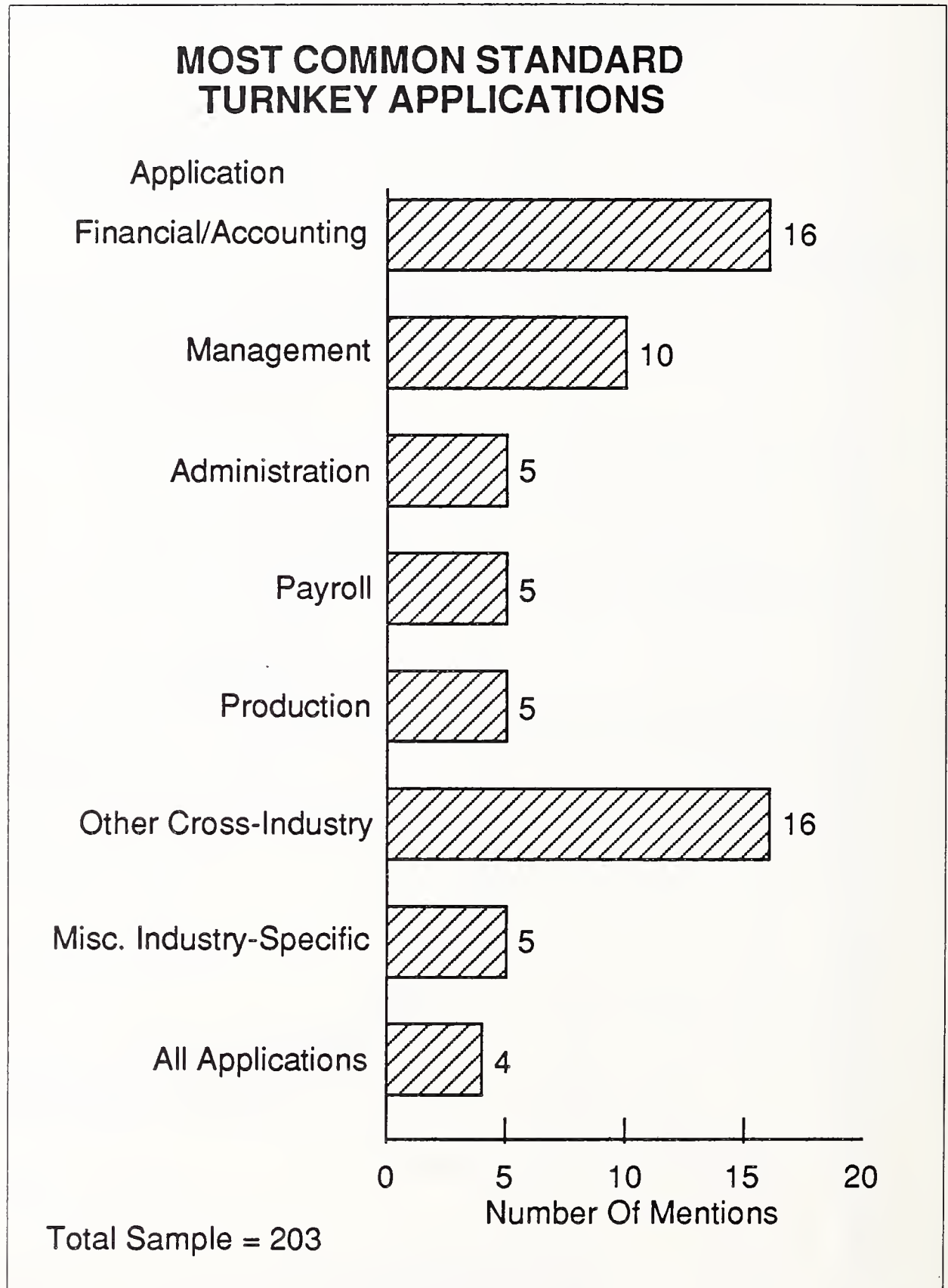
EXHIBIT VII-6



The most common types of applications for standard turnkey systems are listed in Exhibit VII-7. Financial and accountancy applications were the most common ones mentioned. Ten respondents mentioned management applications (these were mainly French users, giving the general term "Gestion"). Administration, payroll and production received enough mentions to warrant listing. There were a significant number of other

applications receiving one or two mentions. Four respondents said all their application areas used standard turnkey systems.

EXHIBIT VII-7



The reasons given by users for using applications software as part of a standard turnkey system are listed in Exhibit VII-8. Two responses dominated—cost, and the need to comply with the corporate standard or a standard used by other companies (suppliers or customers, for ex-

ample). Ease of use and time savings were the only other responses given by a significant number of users. The other reasons given are all listed.

EXHIBIT VII-8

### USERS' REASONS FOR USING STANDARD TURNKEY SOLUTIONS

REASON	NO. OF MENTIONS
Cost Reasons	17
To Comply with Corporate/Other Standard	17
Easiest to Set Up and Use	12
To Save Time	8
We Liked the Software	2
Advice from the Hardware Manufacturer	1
The Hardware Manufacturer Supplied Good Software	1
Fewer People Involved	1
Reliability	1
Training Less Expensive	1
Advice from Consultants	1
Advice from Management	1
This Supplier Is More Aware of Our Specific Needs	1
Most Flexible Solution	1



It is clear that many users prefer to buy a prepackaged solution that saves them money, time and effort. It is important, therefore, for vendors of standard turnkey systems to convince potential customers that customers will obtain these benefits.

## D

### Users' Problems and Priorities

Exhibit VII-9 illustrates the major problems mentioned by users in relation to applications software products.

EXHIBIT VII-9

#### MAJOR PROBLEMS ENCOUNTERED BY USERS WITH APPLICATIONS SOFTWARE PRODUCTS

PROBLEM	NUMBER OF MENTIONS		
	General Mgmt.	DP Mgmt.	Total
Poor Features/Performance	29	32	61
Poor Documentation	21	30	51
Difficult to Use	20	12	32
Maintenance	7	15	22
Poor Training	7	13	20

Total Sample = 203

A large number of users expressed dissatisfaction with the features or performance. Among the additional comments related to this made by users were:

- The need for modification of the software
- Incompatibility
- Inflexibility
- Package too general

The second most frequently mentioned problem was documentation. This is particularly significant in the light of the importance rating given to documentation by users (see Exhibit VII-10).

Several users commented that documentation should be less technical and more concise, or should give commands only.

Seven French users (sample size 42) and three Spanish users (sample size 19) commented specifically on the lack of good documentation in their own languages.

A significant number of users (mainly departmental managers) said they had found applications software difficult to use. Maintenance and training problems were reported mainly by DP managers.

Users' ratings of the importance of a number of criteria related to applications software are shown in Exhibit VII-10.

Ease of use is considered by users to be the most important requirement on the list. Documentation also gets a very high rating. This last rating is especially noteworthy, given the high level of dissatisfaction with documentation expressed by users (Exhibit VII-9).

Ongoing application support also receives a high rating by users. Three criteria receive an average rating of 8.0. It is interesting to note that one of these, on-site maintenance, was considered much more important by departmental managers than by DP managers.

At the bottom of this list, in terms of users' concerns, is the financial strength and track record of the vendor. Users are more concerned with the vendors' knowledge of the user's own industry, and the specific application area.

The respondents also considered price not to be of critical importance. However, the ratings varied considerably on this issue. A significant number gave price a rating of ten, while there was also a high proportion of low ratings.

The importance given to the availability of source code would not appear to be great if one were to judge by the average rating. However, it should be pointed out that a very large number of respondents (about one quarter) gave availability of code the maximum rating. The average was brought down by the significant number of departmental managers who

## EXHIBIT VII-10

### USERS' RATINGS OF THE IMPORTANCE OF APPLICATIONS SOFTWARE CRITERIA

ISSUE NO.	ISSUE	AVERAGE RATING		
		Gen. Mgmt.	DP Mgmt.	Overall
1	Vendor Financial Strength/Track Record	6.50	6.67	6.6
2	Vendor Knowledge of User Industry	7.23	7.28	7.3
3	Vendor Knowledge of Specific Applications	7.28	7.60	7.4
4	Documentation	8.38	8.55	8.5
5	Ease of Use	8.89	8.93	8.9
6	Training	8.04	7.88	8.0
7	Ongoing Application Support	8.30	8.24	8.3
8	On-Site Maintenance	8.31	7.66	8.0
9	Remote Diagnostics/Off-Site Maintenance	7.66	7.32	7.5
10	Price	7.23	6.95	7.1
11	Ease of Modification	7.86	8.12	8.0
12	Availability of Source Code	6.86	7.47	7.2

gave it a zero rating. This low rating may be due in part to not understanding the importance of source code.



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**E**

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**Application  
Development  
Priorities**

Users' plans for future application development are summarised in Exhibit VII-11. Accounting applications lead the ranking. Sales/Marketing comes a close second, contrasting with its relatively low position in Exhibit VII-1. This result indicates an increasing awareness among users of the need and ability to automate an area that up to now has largely been overlooked.

Production is another application area that users consider to be a priority. The general area that could be called Management Information was also mentioned by a significant number of users. INPUT interprets this as an indication of the demand for software that can help managers in strategic planning (related to Planning and Analysis software).

It is worth mentioning that a significant number of vertical applications were said to be priorities for users, particularly in the medical, government and banking areas.

In the final question, users were asked if there were any types of software products that they would like to have that are currently not available. About half of the respondents said they could not think of any. The suggestions given by the other respondents were quite varied, and few applications were mentioned more than once or twice. Computer-aided design (CAD) was, however, mentioned in several suggestions. Many of the applications mentioned were industry specific.



## EXHIBIT VII-11

**APPLICATION DEVELOPMENT PRIORITIES**

	GEN. MGMT.	DP MGMT.	TOTAL
Accounting	13	18	31
Sales/Marketing	14	16	30
Production	7	17	24
Management Information	9	10	19
Stock Control	4	14	18
Office Communication	9	9	18
Technical/Scientific	7	9	16
Distribution	3	12	15
Finance	8	5	13
All Areas	7	6	13
Planning & Analysis	7	4	11
Data Base	3	6	9
Administration	3	4	7
*Medical Applications	5	2	7
*Government Applications	4	2	6
*Banking	3	3	6
Payroll	5	0	5
Personnel	4	0	4
Word Processing	3	1	4
*Transport Applications	3	1	4
*Insurance Applications	1	1	2
*Manufacturing Applications	1	1	2
*Utilities	1	0	1
Other	0	1	1
Total	124	142	266

\* = Industry-specific applications

Total Sample = 203

**F****Software Purchase  
Procedures**

Users were asked to briefly describe the process of decision making within their organisations for the purchase of applications software. The responses are summarised in Exhibits VII-12 and VII-13.

INPUT suggested four possible parties that might have an influence in a purchasing decision. These are listed in Exhibit VII-12, together with the corresponding number of respondents.

Department heads easily come out on top with 120 mentions. Some form of internal steering committee is also common in user organisations, judging by the responses (72 mentions). The other two parties (Parent Company/Outside Department and Consultants) were each mentioned only 14 times.

**EXHIBIT VII-12**

**DECISION-MAKING PROCESS  
WITHIN USER ORGANISATIONS  
FOR THE PURCHASE OF  
APPLICATIONS SOFTWARE PRODUCTS**

INFLUENTIAL PARTIES (PROMPTED RESPONSE)	NO. OF MENTIONS
Department Head	120
Internal Steering Committee	72
Advice of Consultants	14
Recommendation of Parent Co. or Other Dept./Division	14

Total Sample = 203

Most of the users interviewed made additional comments regarding the purchasing of applications software in their organisations. These comments have been summarised in Exhibit VII-13 by cross-referencing the main decision makers with the main recommenders.

For example, analysis of users' comments suggests that, in 29 cases, general management makes the final decision on the purchase of applications software on the advice or recommendation of the department head. This particular combination was the most frequent one given by respondents.

Looking at Exhibit VII-13, it can be seen that in a considerable number of cases, general management has the final say. DP managers and department heads also have the power to make decisions in a large number of companies. In some companies, there was more than one major decision maker. These are included under "joint decision".

The department heads make the recommendations regarding the purchase of applications software more than any other single person. Evidently end users would have a certain influence in a lot of these cases. In 24 cases, it was clear that the end users themselves made the recommendation. DP managers also feature prominently in this role with 23 mentions. There were a lot of cases where the advice was given by a combination of the parties listed ("combination") or where the recommendation came from elsewhere ("other").

## EXHIBIT VII-13

### MAIN ADVISORS AND DECISION MAKERS FOR PURCHASE OF APPLICATIONS SOFTWARE— ANALYSIS OF USER RESPONSES

ADVICE/ RECOMMEN- DATION FROM	FINAL DECISION BY							
	Gen. Mgmt.	DP Mgr./ Dept.	Dept. Head	Finance Dept.	Parent Co.	Joint Decision	Other	Total
Department Head	29	14		1	2		2	48
Users	9	5	6	4	-	2	-	26
DP Manager/ Dept.	17	-	-	-	2	1	3	23
Consultants	3	1	4	-	-	1	2	11
Parent Company	-	-	-	-	-	-	1	1
Combination	7	1	1	-	-	15	-	24
Other	2	6	8	-	-	1	-	17
Total	67	27	19	5	4	20	8	150

Total Sample = 203

## G

### Suppliers

Exhibit VII-14 shows the main types of suppliers used by the companies interviewed for applications software products. Most companies buy from independent software companies, which would include software developers and distributors. Almost half of the respondents said that they buy applications software directly from hardware manufacturers. The only other significant source of applications software products is systems houses. Value-added resellers and OEMs barely featured.

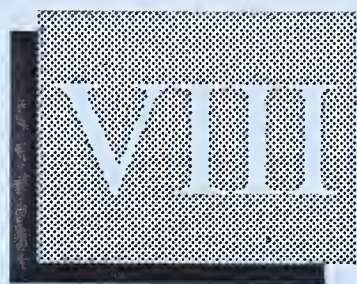


EXHIBIT VII-14

**PREFERRED TYPE OF SUPPLIER**

	GEN MGMT.	DP MGMT.	TOTAL
Software Independent	70	59	129
Hardware Manufacturer	42	51	93
Systems House	16	26	42
Value-Added Reseller	1	1	2
OEM	0	1	1

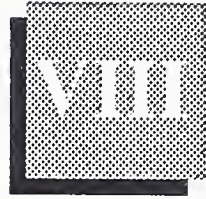
Total Sample = 203



## Current Trends and Issues







## Current Trends and Issues

This chapter deals with a number of important trends and issues related to the applications software industry which are not discussed in detail elsewhere in this report.

### A

**The Kernel Approach** INPUT's research has revealed a number of changes in the way software has been developed:

- Users are spending fewer of their DP resources on in-house software development and more on the implementation of standard packages and the adaptation of kernels to their specific requirements.
- Software houses are now developing more kernels or core-functional products. This consequently means that they now spend more of their professional services time on the adaptation of kernels to the customers' requirements than on the development of totally individual solutions.

The essence of this approach is that it reuses components common to an industry and combines them to give the customer a unique system. This approach also allows the provider to offer custom-built software at a lower price and a shorter time scale when compared with a system that is completely custom built. A kernel system can continually grow to keep up with the application, providing a flexibility that the package cannot.

In general, kernel software tends to cover the most difficult parts of a system, providing an added productivity bonus. The areas where custom building is needed tend to be outside the systems and covering such things as screen designs and report layouts. This is also the area where the customer can gain the best competitive edge.



Two of the U.K.'s leading professional services companies, Scicon (now part of SD-Scicon) and Logica, have made kernels a key part of their business approach.

In Scicon's case, the kernel approach has evolved through its work in the oil sector, manufacturing, finance and the government sector.

A similar route that is being taken by software package suppliers is the package-plus-language approach. Examples are Cincom and Cullinet, both of which have built their reputation on supplying database management packages that may be used as the central part of an application.

They have evolved fourth-generation languages (Cincom's Mantis and Cullinet's ADS) to allow applications to be built around the central database.

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## B

### CASE Tools

There has been a significant increase in the use of Computer-Aided Software Engineering (CASE) tools in recent years. (See INPUT's report entitled *Computer-Aided Software Engineering in Europe 1987-1992*.)

Being a relatively new field, however, the market penetration of CASE tools is still limited. As yet, most user organisations are not ready, in terms of data processing organisation methods and culture, to adopt a CASE approach.

As CASE software products evolve, it can be expected that more users will adopt the CASE approach for developing larger systems.

This development has a number of implications for the applications software market. On one hand, CASE tools can be seen as a threat to applications software houses, as users obtain the means to develop applications more easily.

However, CASE tools are not perceived in this light by most vendors interviewed by INPUT. CASE tools are seen by many as a means of adapting products (or kernels) to individual customers' needs. They can be used by either software houses or users, in conjunction with standard kernels to satisfy the end users' exact requirements.

Some vendors use CASE tools to assist in adapting existing products for foreign markets. The requirements for many products will be different in other countries, and CASE tools help automate the adaptation process.

Hence CASE tools can be seen as providing opportunities rather than threats for applications software vendors. INPUT recommends that software developers examine how CASE tools could help them in the development of software products, but more particularly how these tools could be used in conjunction with kernels.

## C

### Trend Towards Real-Time Software

There has for some time been a trend towards increased use of real-time software.

INPUT's user research indicated that many companies that have been using batch-oriented systems for fifteen or twenty years now find that they cannot remain competitive with these systems and need to replace them with real-time systems.

Users are becoming accustomed to, and thus expect, real-time in all systems. The integration of different systems means that they all must be converted to real-time for increased efficiency. For example, accounts packages that are integrated with material requirements planning (MRP) systems must be real-time in order that transactions can be updated immediately in the general ledger.

Europe's leading applications software products company, SAP, built its business on real-time software from an early stage. The company's success is largely due to having seen this need, and integrating the various commercial applications required by customers.

The U.K.-owned company, Quality Software Products Limited, which was established in 1981, has also built up its business (1987 turnover around £4 million) on a range of integrated real-time accounting and financial management software products.

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**D****Limited Mainframe Base**

The number of new mainframe computers being installed annually has decreased over the past few years due mainly to the availability of more powerful smaller computers (micros and workstations). These smaller machines are achieving significant improvements in memory capacity and communications connectivity and hence are taking over from mainframes in some companies.

Although the proportion of applications software developed for mainframes will still remain high, vendors of mainframe products should consider the possibility of diversifying into software for smaller computers.

In recognition of the increasing importance of microcomputers, some vendors are now introducing micro-based versions of applications software products that were initially developed for mainframes.

A typical example is Metier, which recently introduced a PC version of its project management product, Artemis.

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**E****Workstations—The Opportunity**

The European market for workstations is growing rapidly at present. Workstations have so far only penetrated a small part of their potential market, but high growth (INPUT predicts 50% per annum) is expected into the early 1990s.

Three U.S. companies—Sun, Apollo and Hewlett-Packard—claim 80% of the European workstation market. Their machines are eating into the lower end of the mini market. A Japanese company, Sony, recently announced that it will start production of its workstations in the U.S. It is likely that Sony will follow with moves into the European workstation market.

Only a tiny proportion of workstations are used for commercial applications (about 5%), the vast majority being used in engineering and design. The technology can be applied to many areas, however, and already this is happening—in the financial world, for example. Over the next few years, the commercial world will account for an ever-increasing share of the workstation market.

Workstation prices are coming down, making them a more-affordable proposition for smaller companies. INPUT estimates that by 1993, around 90% of workstations sold will be used for commercial applications.



A major opportunity exists for software suppliers that can provide products for this rapidly growing market. This is an example of a market where the software is lagging behind the hardware, and thus software companies that can develop new products (particularly in the commercial area) will have the ability to penetrate the market at its high-growth stage.

The workstation manufacturers do not normally provide their own applications software products, but rely (like other hardware manufacturers) on third-party software companies to develop them. Sun, for example, can provide its users with a catalogue of over 1,200 software products for its machines. Most of these products are developed by U.S. companies, though Sun claims that about 150 U.K. companies also supply products. In the past year, Sun has acquired a number of software companies as a means of improving its long-term position.

In May 1987, Sun acquired Trancept Systems Inc., which is engaged in the development of accelerator products for computation- and graphics-intensive applications on Sun workstations. In February 1988, Sun announced a deal with Innovative Software Inc. to jointly develop new applications software for Sun workstations.

The majority of software used with workstations is standard. INPUT believes that third-party software vendors should not ignore the potential in this area.

## F

### Growing Consensus for Industry Standards

The issue of standards in the computer industry is one that greatly concerns vendors and users. It is becoming more of a live issue as moves towards standardisation finally seem to be gaining ground.

Two of the most significant developments in this area in the past two years, discussed below, have been:

- The increasing recognition of UNIX as a viable operating system
- The announcement by IBM of its Systems Applications Architecture (SAA)



## 1. UNIX

The technical viability of UNIX has been widely accepted for some time, and it has slowly but surely been making its way into the market. The major hardware manufacturers have given their support in principle to UNIX. Hence its success now looks secured.

In May 1988, the Open Software Foundation (OSF) was formed to develop an alternative UNIX standard. This was in response to a recent agreement between Sun Microsystems and AT&T to rewrite UNIX, which suggested to competitors that AT&T may be working to make UNIX more of a proprietary operating system. Competitive concerns were further heightened by a recent agreement between Sun and Microsoft to develop a UNIX standard by combining several existing versions of UNIX.

OSF currently consists of eight sponsors: IBM, DEC, Hewlett-Packard, Groupe Honeywell Bull, Apollo, Nixdorf, Siemens and N.V. Philips.

The ultimate goal of the OSF's work is to create an open software environment that makes it easier for users to integrate systems and software from many vendors. Towards that end, the foundation's work will address the need for "portability, interoperability and scalability". Portability is the ability to run applications software on computers from many different vendors. Scalability is the ability to host the same software environment on a wide range of computer platforms, from desktop PCs to supercomputers.

The growth in demand for UNIX-based applications software is expected to be significant in the coming years. Already a good range of UNIX applications software packages is available, and INPUT predicts an annual growth rate of approximately 40% for the next five years. Software developers would thus be well advised to look closely at UNIX as a possible diversification area.

## 2. SAA

IBM's Systems Applications Architecture (SAA) is another attempt to introduce standards. SAA was announced at the end of 1986, but IBM's first software products based on SAA will not appear until 1989.

Independent software developers are being encouraged by IBM to adapt old products and write new ones to conform with the new architecture.

IBM users are also now beginning to ask software suppliers if their products are compatible with SAA.

The implementation of SAA will have a noticeable impact on the software industry. IBM has set new ground rules for applications systems that will cause more competition, better functionality, and probably lower prices. Though SAA may be imperfect in its totality, vendors that do not analyse and determine how to coexist may face difficult times.

There is no doubt that IBM is using SAA as a means to maintain dominance in the software market and increase its penetration in application software/systems, an area in which IBM has not been as successful as it was in systems software.

Given the recent developments with UNIX (notably the formation of the Open Software Foundation), INPUT predicts that IBM will now include UNIX in SAA.

## G

### Industry Concentration

There has been much merger and acquisition activity recently involving software developers. Companies are constantly seeking opportunities for growth and strategic advantage. The industry is still relatively young and immature, and hence consolidation is occurring.

Small software developers with good ideas are being acquired by larger companies. Amongst the larger players, mergers are also taking place. The result of these developments is that large independent software companies are emerging and many of the medium-size ones are realising the necessity to engage in partnerships with other companies.

The most notable mergers and takeovers that have taken place in Europe over the past year have involved large professional service companies. These include:

- The merger of Sema Metra and CAP Group (the new company is called Semacap).
- The fusion of Systems Designers and Scicon to form SD-Scicon.
- Cap Gemini Sogeti has continued its expansion in Europe and North America.

Acquisitions involving software product companies have been on a smaller scale. Some of the most important ones that have taken place in Europe have involved U.K.-owned companies. Among them were:



- The acquisition of BIS by Nynex.
- The acquisition by Misys of the business software company BOS.
- Kewill Systems PLC's acquisition of Trifid Software.

There have been several cases of large industrial groups buying or taking shares in software houses. This is particularly evident in West Germany. Some of the most important ones include:

- BMW took a shareholding in Softlab.
- Thyssen bought one-third of IKOSS.
- Deutsche Atlantische Telegrafien (DAT) bought several small software houses.
- Hoesch AG, which already owns MBP, bought two small software houses.

There has been considerable takeover activity in Italy, involving mainly the Finsiel Group and Olivetti. As well as buying several software houses in Italy, Olivetti has also made acquisitions as far afield as Norway.

A characteristic of the Scandinavian market is the high number of software houses that belong to large groups. In the past year several small Norwegian companies have been bought out. One of the most important recent mergers in the Scandinavian software market involved the Norwegian companies Nordata and Vestdata. The trend towards further concentration in the Scandinavian markets is expected to continue.

Despite the general concentration in the European market, the vast majority of software companies are very small operations, in many cases with less than 10 employees. Numerous small companies are being set up to take advantage of opportunities that present themselves. Not all prove successful, but such companies very often have the ability to exploit niche market opportunities that larger companies cannot.

## H

### Pricing

Detailed analysis of software pricing strategies can be found in INPUT's report entitled *Software Product Pricing and Support Strategies in Europe, 1987-1992*.

Because of the "intellectual property" characteristics of software, when buying it as a product, the user purchases a license to use the product, and not the product itself.

Licenses issued in today's marketplace are principally of two kinds:

- Short-term licenses are of a duration typically between two and five years. They are most frequently used to license system software programmes, where the product upgrade lifecycle is short.
- Long-term licenses are normally of indefinite duration—i.e., “in perpetuity” unless rescinded for one reason or another. Some vendors set an arbitrary time of expiring—e.g., with a license for 30 years’ “right to use”.

INPUT's 1987 research revealed that a number of different methods of levying software product license fees (for systems and applications software) are current in the marketplace. In order of “popularity” as measured by user expenditure, the main options are:

- An initial or one-time fee paid on successful installation
- Regular license fees—paid annually, quarterly or monthly
- An installment plan, essentially paying an initial fee over a number of months or years
- Prices by usage of machine resources over an agreed period
- A combination of the first and second method, whereby the first-year fee is larger than that for subsequent years

INPUT's vendor research for the above-mentioned study reveals that price is seldom a major factor in a user's decision to purchase applications software (especially for mainframes). Users are willing to pay a higher price if they are getting the solution they need.

INPUT's user research also shows that price is not one of the major concerns (see Exhibit IV-9), especially with DP managers. It should be noted, however, that the importance ratings given by users varied considerably on this issue. Hence vendors should treat pricing with care.



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Support and Maintenance

For detailed background on support and maintenance issues, the reader is recommended to consult INPUT's report entitled *Software Product Pricing and Support Strategies in Europe, 1987-1992*.

INPUT's 1987 research indicated that support and maintenance remain confused concepts in the understanding of many software customers. INPUT's definitions disentangle the two:

- Support covers all the help the user needs during the lifetime of product "ownership".
- Maintenance covers activities of the vendor that correct, update, enhance, distribute and redistribute the product over the course of its lifetime.

Vendor maintenance contracts include elements of both types of activities, chief among which are:

- "Hotline" telephone support, now offered in almost 100% of contracts.
- Regular upgrades and enhancements to the product, offered to some level in about two-thirds of contracts.

Training is accepted by the users as a separately chargeable item. Training is largely effective in getting users to understand the implementation and initial installation of products.

More problematical is the business of how a user develops applications in concert with chosen vendors that have general product enhancement programmes underway.

Information and application consultancy are the principal vendor tools in smoothing users' upgrade paths.

INPUT's user research for this present study showed support, maintenance and training to be among the more important priorities, as shown in Exhibit VII-10.

DP managers mentioned maintenance and training quite often as the major problems they have had with applications software products, while departmental managers were not quite so concerned (see Exhibit VII-9).

**J****Documentation**

INPUT's research revealed that users consider good documentation to be of the utmost importance. It is also clear that a significant number of users are not satisfied with the documentation they are getting (see Exhibits VII-9 and VII-10).

A number of users commented that documentation should be less technical and more concise, or that it should give commands only. It was also pointed out by several users in France and Spain that there is a lack of good documentation in their native languages.

Vendors should be aware of the necessity to provide documentation in other languages for foreign markets. English is acceptable in some cases—in certain technical/scientific applications and in certain countries. In the Netherlands, the Scandinavian countries and West Germany, for example, English is often acceptable in business, though vendors would also do better here to translate the documentation. Vendors should be careful not to compromise quality by poor translation.

INPUT recommends that vendors also examine new technologies—e.g., optical media, such as CD-ROM, etc.—and their possibilities for improving text and image information in documentation.

**K****Software Leasing**

Up to now, software leasing has failed to take off, unlike the hardware leasing market, because of doubts over the physical value—and hence tax relief—on software.

However, escalating software costs have made leasing a more attractive option. And following favourable guidance from the U.K. Inland Revenue, which said software could be classed as tangible assets and would therefore qualify for standard capital allowances, a few companies have launched leasing schemes.

ECS, a subsidiary of the French banking group Societe Generale, and one of the U.K.'s leading computer leasing companies, launched a scheme directed at software for IBM machines. ECS claims that its plan leaves ownership unambiguously with the programming company.

Pallas Leasing, a subsidiary of the merchant bank SG Warburg, also recently announced a leasing plan. The company has a target of £10 million worth of software leasing over the next year.

It has yet to be seen how software leasing will catch on. Controversy over costing and the risks to intellectual property rights remains, and most software companies have not yet committed themselves.

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## L

### Copyright

The war against software piracy has escalated dramatically in the past year or so.

A major offensive began in July 1987, when 15 nations signed an agreement proposing that international copyright laws should form the basis for protecting software.

In the U.S., where it is estimated that piracy costs the PC software industry between \$200 million and \$400 million per year, the main PC software companies (including Lotus, Microsoft, and Ashton Tate) have formed an antipiracy body. IBM declined an invitation to join this group, but is itself fighting piracy.

One of the main centres for organised software piracy is Hong Kong, where it is estimated that, for every package sold, there are ten illegal copies made. Other illicit production centres that have been mentioned by American software companies are: Italy, Spain, Austria, Saudi Arabia, Mexico, Venezuela, Argentina and Canada.

Of the major European markets, the problem is the worst in Italy. There are no laws forbidding software piracy, and hence the problem is widespread. There are plans to outlaw piracy, but these laws are not expected to come into operation for some time.

In the U.K., there has been a serious attempt to defeat the problem, and the courts have begun to give prison sentences for software piracy. The government is planning to introduce a copyright bill in the near future that will give improved protection to software vendors.

The software industry was initially concerned with a section of the bill that says software could be hired out by rental companies just one year after the product is launched. This provision has now been changed and, if the bill is passed, the ability to prevent someone renting out software will apply to the full 50-year term of the copyright.



In France, a law was passed in 1985 to protect software. This law is being enforced effectively, with the help of the antipiracy body. One of the controversial results of the law is that four lecturers at the University of Toulouse have recently been charged with software piracy.

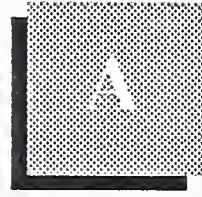






## Appendix: Definitions





## Appendix: Definitions

*Information Services* - The provision of:

- Data processing functions using vendor computers (processing services).
- The provision of database access where computers perform an essential role in the processing or conveyance of data.
- Services that assist users to perform functions on their own computers (software products and/or professional services).
- A combination of hardware and software, integrated into a total system (standard turnkey systems).

### A

#### Revenue

All revenue and user expenditures reported are available (i.e., noncap-  
tive) revenue, as defined below.

*Noncaptive Information Services Revenue* - Revenue received for infor-  
mation services within Western Europe from users who are not part of  
the same parent corporation as the vendor.

*Captive Information Services Revenue* - Revenue received from users  
who are part of the same parent corporation as the vendors.

*Other Revenue* - Revenue derived from lines of business other than those  
defined above.

### B

#### Service Modes

*Processing Services* - Remote computing services, batch services, and  
processing facilities management.



- *Remote Computing Services (RCS)* - Provision of data processing to a user by means of terminals at the user's site(s) connected by a data communications network to the vendor's central computer. There are four submodes of RCS:
  - *Interactive (timesharing)* - Characterised by the interaction of the user with the system, primarily for problem-solving timesharing but also for data entry and transaction processing; the user is online to the program/files.
  - *Remote Batch* - Where the user hands over control of a job to the vendor's computer, which schedules job execution according to priorities and resources requirements.
  - *Database* - Characterised by the retrieval and processing of information from a vendor-provided database. The database may be owned by the vendor or a third party.
  - *User Site Hardware Services (USHS)* - These offerings provided by RCS vendors place programmable hardware on the user's site (rather than in the EDP center). USHS offers:
    - Access to a communications network.
    - Access through the network to the RCS vendor's larger computers.
    - Significant software as part of the service.
- *Batch Services* - This includes data processing performed at vendor's sites of user programs and/or data that are physically transported (as opposed to electronically by telecommunications media) to and/or from those sites. Data entry and data output services, such as keypunching and computer output microfilm processing, are also included. Batch services include those expenditures by users who take their data to a vendor site that has a terminal connected to a remote computer for the actual processing.
- *Processing Facilities Management (PFM)* (Also referred to as 'resource management' or 'systems management') - The management of all or a major part of a user's data processing functions under a long-term contract (more than one year). This would include both remote computing and batch services. To qualify as PFM, the contractor must directly plan, control, operate, and own the facility provided to the user, either on-site, through communications lines, or in a mixed mode.

Processing services are further differentiated as follows:

- *Function-specific* services are the processing of applications that are targeted to specific user departments (e.g., finance, personnel, sales) but

cut across industry lines. Most general ledger, accounts receivable, payroll, and personnel applications fall into this category. Function-specific database services where the vendor supplies the database and controls access to it (although it may be owned by a third party) are included in this category. General-purpose tools such as financial planning systems, linear regression packages, and other statistical routines are also included. However, when the application, tool, or database is designed for specific industry use, then the service is industry specific.

- *Industry-specific* services provide processing for particular functions or problems unique to an industry or industry group. The software is provided by the vendor either as a complete package or as an applications 'tool' that the user employs to produce a unique solution. Specialty applications can be either business or scientific in orientation. Industry-specific database services, where the vendor supplies the database and controls access to it (although it may be owned by a third party), are also included under this category. Examples of industry-specific applications are seismic data processing, numerically controlled machine tool software development, and demand deposit accounting.
- *Utility* services are those where the vendor provides access to a computer and/or communications network with basic software that enables users to develop their own problem solutions or processing systems. These basic tools include terminal-handling software, sorts, language compilers, database management systems, information retrieval software, scientific library routines, and other systems software.

*Software Products* - This category includes users' purchases of applications and systems packages for use on in-house computer systems. Included are lease and purchase expenditures, as well as fees for work performed by the vendor to implement and maintain the package at the users' sites. Fees for work performed by organisations other than the package vendor are counted in professional services. There are several subcategories of software products.

- *Applications Products* - Software that performs processing to service user functions. They consist of:
  - *Cross-Industry Products* - Used in multiple-user industry sectors. Examples are payroll, inventory control, and financial planning.
  - *Industry-Specific Products* - Used in a specific industry sector such as banking and finance, transportation, or discrete manufacturing. Examples are demand deposit accounting and airline scheduling.



- *Systems Products* - Software that enables the computer/communications systems to perform basic function. They consist of:
  - *Systems Control Products* - Function during applications program execution to manage the computer system resource. Examples include operating systems, communication monitors, emulators, and spoolers.
  - *Data Center Management Products* - Used by operations personnel to manage the computer system resources and personnel more effectively. Examples include performance measurement, job accounting, computer operations scheduling, and utilities.
  - *Applications Development Products* - Used to prepare applications for execution by assisting in designing, programming, testing, and related functions. Examples include languages, sorts, productivity aids, data dictionaries, database management systems, report writers, project control systems, and retrieval systems.

*Professional Services* - Made up of services in the following categories:

- *Education Services* - EDP products and/or services - related to corporations, not individuals.
- *Consulting Services* - EDP management consulting and feasibility studies, for example.
- *Contract Staff* - User-managed temporary EDP staff supplied by service organisation.
- *Custom Software Development* - Including system design, programming, testing, documentation and project management.
- *Professional Services Facilities Management (PSFM)* - The counterpart to processing facilities management, except that in this case the computers are owned by the client, not the vendors; the vendor provides people to operate and manage the client facility.

*Standard Turnkey Systems* - An integration of systems and applications software with hardware, packaged as a single entity. The value added by the vendor is primarily in the software. Most CAD/CAM systems and many small business systems are standard turnkey systems. This does not include specialised hardware systems such as word processors, cash registers, and process control systems.

Standard turnkey systems revenue in this report is divided into two categories:

- *Industry-Specific* systems; i.e., systems that serve a specific function for a given industry sector such as seismic processing systems, automobile dealer parts inventory, CAD/CAM systems, discrete manufacturing control systems, etc.
- *Cross-Industry* systems; i.e., systems that provide a specific function that is applicable to a wide range of industry sectors such as financial planning systems, payroll systems, personnel management systems, etc.

Revenue includes hardware, software, and support functions.

*Systems Integration* - Services associated with systems design, integration of computing components, installation, and acceptance of computer/communications. Systems integration can include one or more of the major information services delivery modes—professional services, turnkey systems, and software products. System components may be furnished by separate vendors (not an integrated system by one vendor, called the prime contractor); services may be furnished by a vendor or by a not-for-profit organisation. Integration services may be provided with related engineering activities, such as SE&I (Systems Engineering and Integration) or SETA (Systems Engineering and Technical Assistance).

## C

### Hardware/Hardware Systems

*Hardware* - Includes all computer communications equipment that can be separately acquired, with or without installation by the vendor, and not acquired as part of a system.

- *Peripherals* - Includes all input, output, communications, and storage devices, other than main memory, that can be locally connected to the main processor and generally cannot be included in other categories, such as terminals.
- *Input Devices* - Includes keyboards, numeric pads, card records, bar-code readers, lightpens and trackballs, tape readers, position and motion sensors, and A-to-D (analog-to-dialog) converters.
- *Output Devices* - Includes printers, CRTs, projection television screens, microfilm processors, digital graphics, and plotters.
- *Communication Devices* - Modems, encryption equipment, special interfaces, and error control.



- *Storage Devices* - Includes magnetic tape (reel, cartridge, and cassette), floppy and hard disks, solid state (integrated circuits), and bubble and optical memories.

*Terminals* - There are three types of terminals:

- *User Programmable* (Also called 'intelligent terminals'):
  - Single-station or standalone.
  - Multistation-shared processor.
  - Teleprinter.
  - Remote batch.
- *User Nonprogrammable*:
  - Single-station.
  - Multistation-shared processor.
  - Teleprinter.
- *Limited Functions* - Originally developed for specific needs, such as POS (point of sale), inventory data collection, controlled access, etc.

*Hardware Systems* - Includes all processors, from microcomputers to super (scientific) computers. Hardware systems require type- or model-unique operating software to be functional, but the category excludes applications software and peripheral devices, other than main memory and processor or CPUs, not provided as part of an integrated (turnkey) system.

- *Microcomputer* (or personal computer or PC) - Combines all of the CPU, memory, and peripheral functions of an 8- or 16-bit computer on a chip, in the form of:
  - Integrated circuit package.
  - Plug-in board with more memory and peripheral circuits.
  - Console—including keyboard and interfacing connectors.
  - Personal computer with at least one external storage device directly addressable by CPU.
- *Minicomputer* - Usually a 12-, 16-, or 32-bit computer which may be provided with limited applications software and support and may represent a portion of a complete large system.
  - Personal business computer.
  - Small laboratory computer.

- Nodal computer in a distributed data network, remote data collection network, connected to remote microcomputers.
- *Mainframe* - Typically a 32- or 64-bit computer, with extensive applications software and a number of peripherals in standalone or multiple CPU configurations for business (administrative, personnel, and logistics) applications also called a general-purpose computer.
  - Large computer mainframes are presently centered around storage controllers but likely to become bus-oriented and to consist of multiple processors (CPUs) or parallel processors; they are intended for structured mathematical and signal processing and are generally used with general purpose von-Newmann-type processors for system control.
  - Supercomputer mainframes are high-powered processors with numerical processing throughout that is significantly greater than the largest general-purpose computers, with capacities in the 10-50 MFLOPS (million floating point operations per second) range, in two categories:
    - *Real-Time* - Generally used for signal processing.
    - *Nonreal Time* - For scientific use, with maximum burst-mode (but sustained speed) capacities of up to 100 MFLOPS, in one of three configurations:
      - Parallel processors.
      - Pipeline processors.
      - Vector processors.
  - Newer supercomputers—with burst modes approaching 300 MFLOPS, main storage size up to 10 million words, and on-line storage in the one-to-three gigabyte class—are also becoming more common.
  - *Embedded Computer* - Dedicated computer system designed and implemented as an integral part of a weapon or weapon system, or platform that is critical to a military or intelligence mission, such as command and control, cryptological activities, or intelligence activities. Characterised by MIL SPEC (military specifications) appearance and operation, limited but reprogrammable applications software, and permanent or semipermanent interfaces. May vary in capacity from microcomputers to parallel processor computer systems. Information services forecasts in this report do not include applications for this type of computer.

## D

## Telecommunications

*Networks* - Interconnection services between computing resources, provided on a leased basis by a vendor to move data and/or textual information from one or more locations to one or more locations.

- *Common Carrier Network (CCN)* - Provided via conventional voice-grade circuits and through regular switching facilities (dial-up calling) with leased or user-owned modems (to convert digital information to voice-grade tones) for transfer rates between 150 and 1,200 baud.
- *Local Area Network (LAN)* - Restricted limited-access network between computing resources in a relatively small (but not necessarily contiguous) area, such as a building, complex of buildings, or buildings distributed within a metropolitan area. One of the two types:
  - *Baseband* - Voice bandwidth at voice frequencies (same as telephone, teletype system) limited to a single sender at any given moment and limited to speeds of 75 to 1,200 baud, in serial mode.
  - *Broadband* - Employs multiplexing techniques to increase carrier frequency between terminals, to provide:
    - Multiple (simultaneous) channels via FDM (Frequency Division Multiplexing).
    - Multiple (time-sequenced) channels via TDM (Time Division Multiplexing).
  - High-speed data transfer rate via parallel mode at rates of up to 96,000 baud (or higher, depending on media).

*Transmission Media* - Varies with the supplier (vendor) and with the distribution of the network on its access mode to the individual computing resource location.

- *Mode* - may be either:
  - *Analog* - Typified by the predominantly voice-grade network of AT&T's DDD (direct Distance Dialing) and by operating telephone company distribution systems.
  - *Digital* - Where voice, data, and/or text are digitised into a binary stream.



- *Media* varies with distance, availability, and connectivity:

- *Wire* - Varies from earlier single-line teletype networks to two-wire standard telephone (twisted pair) and balanced line to four-wire full-duplex balanced lines.
- *Carrier* - Multiplexed signals on two-wire and four-wire networks to increase capacity by FDM.
- *Coaxial Cable* - HF (High Frequency) and VHF (Very High Frequency), single frequency, or carrier-based system that requires frequent reamplification (repeaters) to carry the signal any distance.
- *Microwave* - UHF (Ultra High Frequency) multichannel, point-to-point, repeated radio transmission, also capable of wide frequency channels.
- *Optical Fiber* - Local signal distribution systems employed in limited areas, using light-transmitting glass fibers and with TDM for multichannel applications.
- *Satellites* - Synchronous earth-orbiting systems that provide point-to-point, two-way radios that are linked by a computer system to track mobile phone/data set units; each radio serves a small area called a cell. The computer switches service connection to the mobile unit from cell to cell as the unit moves among the cells.
- *Cellular Radio* - Network of fixed, low-powered; two-way radios that are linked by a computer system to track mobile phone/data set units; each radio serves a small area called a cell. The computer switches service connection to the mobile unit from cell to cell as the unit moves among the cells.

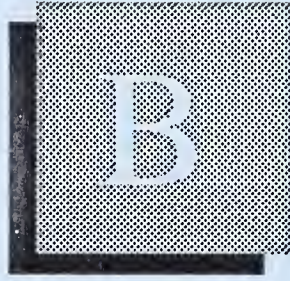
## E

### Other Considerations

When questions arise about the proper place to count certain user expenditures, INPUT addresses them from the user viewpoint. Expenditures are then categorised according to what users perceive they are buying.







## Appendix: Analysis of Research Sample



## EXHIBIT B-1

**USER INTERVIEWS SAMPLING FRAME**

NUMBER OF INTERVIEWS	INDUSTRY SECTOR	NUMBER OF INTERVIEWS	COUNTRY MARKET
32	Discrete Manufacturing	42	France
24	Process Manufacturing	40	West Germany
9	Retail Distribution	42	United Kingdom
31	Wholesale Distribution	20	Italy
9	Transportation	20	Scandinavia
20	Utilities	20	Benelux
45	Banking and Finance	19	Spain
2	Insurance	-	
4	National Government	-	
15	Local Government		
12	Other		
203	All Sectors	203	All Countries

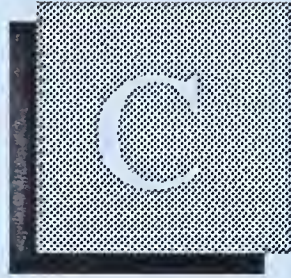
NUMBER OF INTERVIEWS	JOB FUNCTION	NUMBER OF INTERVIEWS	ESTABLISHMENT SIZE
100	MIS/DP Manager (or equivalent)	119	> 1,000 Employees
103	Departmental/General Management	84	500 - 1,000 Employees
203	All Functions	203	All Establishments



## EXHIBIT B-2

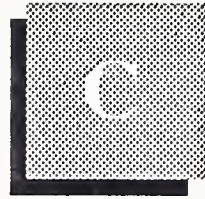
**VENDOR INTERVIEW PROGRAMME**

COUNTRY	SOFTWARE PRODUCTS/ PROFESSIONAL SERVICES VENDORS
France	4
West Germany	5
United Kingdom	9
Italy	2
Scandinavia	3
Netherlands	2
Ireland	2
Total	27



# Appendix: User Questionnaire— Applications Software





## Appendix: User Questionnaire Applications Software

**QU: 1**

Is your department/organisation currently using/planning to use externally sourced standard applications software packages?

Type of Application	Use	Plan to Use
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Note: Type of application can be cross industry (accounts, human resources, education and training, planning and analysis, engineering and scientific. . .) or industry specific. If industry specific, please state precise vertical application.

**QU: 2**

From which of the following type(s) of vendor do you normally buy your applications software products?

- \_\_\_\_\_ Hardware Manufacturer
- \_\_\_\_\_ Software Independent
- \_\_\_\_\_ Systems House
- \_\_\_\_\_ Value-Added Reseller (VAR)



\_\_\_\_\_ OEM

\_\_\_\_\_ Other (Specify) \_\_\_\_\_

**QU: 3**

Over the next two years which applications will have the highest development priority in your company? (e.g. Computer Integrated Manufacturing, Order Entry, . . .)

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

**QU: 4**

Have you acquired any applications software packages as part of a standard turnkey system (pre-packaged hardware/software solution)?

\_\_\_\_\_ Yes                      \_\_\_\_\_ No

If Yes: For what applications?

\_\_\_\_\_  
\_\_\_\_\_

Why did you choose this solution?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**QU: 5**

When evaluating an applications software package how important do you rate the following criteria? (On a scale of 0 to 10 with 0 being irrelevant and 10 being very important.) (Please rotate order)

Financial Strength/Track Record of Vendor \_\_\_\_\_

Knowledge of Your Industry \_\_\_\_\_

Knowledge of Specific Application \_\_\_\_\_

Documentation \_\_\_\_\_

Ease of Use \_\_\_\_\_

Training \_\_\_\_\_

Ongoing Application Support \_\_\_\_\_

On Site Maintenance \_\_\_\_\_

Remote Diagnostics - Off Site Maintenance \_\_\_\_\_

Price \_\_\_\_\_

Ease of Modification \_\_\_\_\_

Availability of Source Code \_\_\_\_\_

**QU: 6**

What would you say are the main problems that you have encountered with applications software products that you have purchased?

(Use the following list as prompts if necessary; rotate order)

- Difficult to Use \_\_\_\_\_
- Poor Features or Performance \_\_\_\_\_
- Lack of Good Documentation \_\_\_\_\_
- Poor Training \_\_\_\_\_
- Maintenance \_\_\_\_\_
- Other (Specify) \_\_\_\_\_

**QU: 7**

Do you use custom developed software for any applications in your department/organisation? (i.e., software developed specially for you specific application).

\_\_\_\_\_ Yes                      \_\_\_\_\_ No

If No, go to QU: 13.

If Yes,

- a. For what applications?

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(for examples of applications, see notes to QU: 6)

- b. Is this software written in-house or sourced externally?

\_\_\_\_\_ In-house          \_\_\_\_\_ Externally Sourced          \_\_\_\_\_ Both

- c. What is the main reason for not using standard products for these applications?

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QU: 8

Could you please briefly describe the process of decision making within your organisation for the purchase of applications software?

Advice of Consultants

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Recommendation of Parent  
Company/Other Department  
Division

---

Internal Steering Committee

---

Department Head

---

Other (Specify)

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**QU: 9**

What types of applications software products would you like to have that are currently not available?

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We appreciate your cooperation in our survey and will send you a short summary of the research findings.

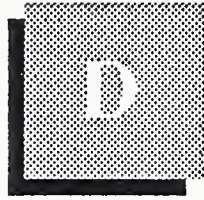






## Appendix: Related INPUT Reports





## Appendix: Related INPUT Reports

- *The Western European Market for Information Services—Analysis and Forecasts, 1987-1992*
- *Software Product Pricing and Support Strategies in Europe, 1987-1992*
- *Computer-Aided Software Engineering in Europe, 1987-1992*
- *Software Products Market, 1987-1992 (U.S.)*







